



The right Hon^{ble} Francis Lo: Veru-
lam, Viscount S^t Alban. mortuus 9 Aprilis,
Anno Dñi. 1626. Aetate 66.

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Et vidit Deus lucem

quod esset bona

Mundus Intellectualis

SYLVA SYLVARVM

OR

A NATURALL HISTORY

In ten Centuries.

*Written by the right Hon^{ble} Francis
Lo. Verulam Viscount S^t Alban.*

Published after y^e Autho^rs Death

*by W. RAWLEY D^r of Divi-
nity &c*

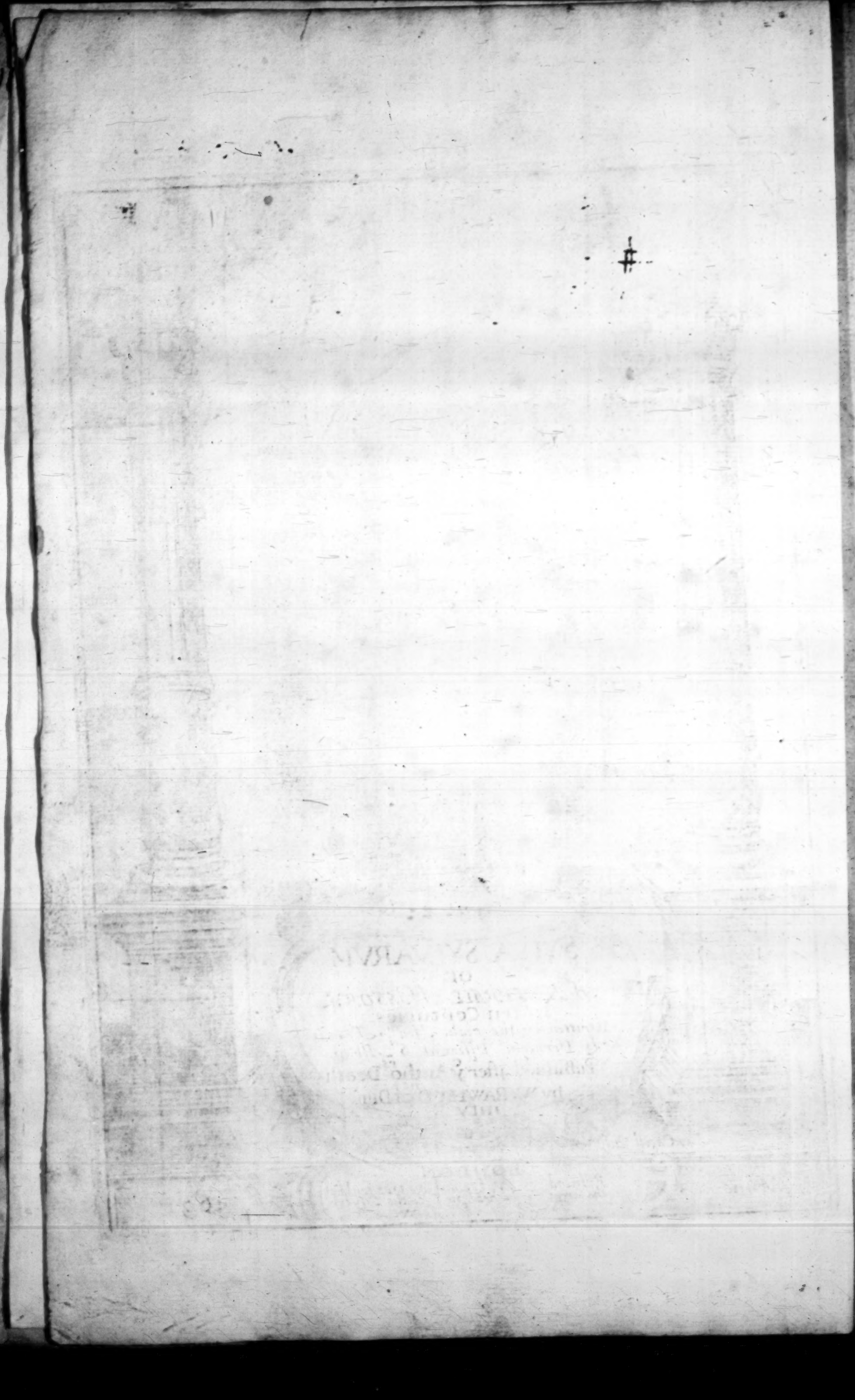
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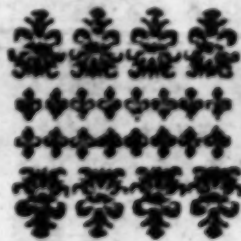
A Naturall Historie.

IN TEN CENTVRIES.

WRITTEN BY THE RIGHT
Honourable FRANCIS LO. Verulam
Viscount St. ALBAN.

Published after the Authors death,
By WILLIAM RAWLEY Doctor in Divinitie,
one of his Majesties Chaplaines.

Hereunto is now added an Alphabeticall Table of the
principall things contained in the whole Worke.

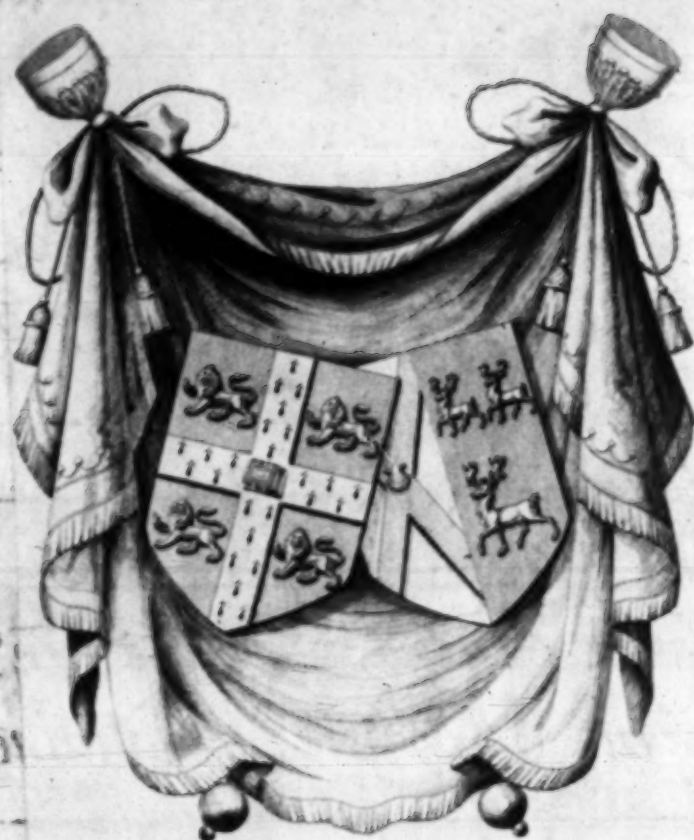


LONDON,
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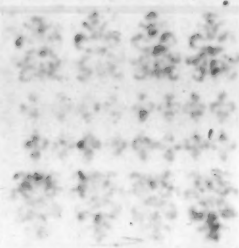
*Finding that the Third Edition of this Work was published in the year 1631
and the fifth Edition appeared in 1639. I conclude that this which was
printed between those ^{years} is the Third Edition fourth Edition.*

SYLVIA
MARIA

A Natural History



Academia Cantabrigiensi
Liber.



LONDON
Printed by John Hays for William Lee
and are to be sold by John Williams 1637.



TO THE MOST HIGH
AND MIGHTY PRINCE
CHARLES,
BY THE GRACE OF GOD,

King of *Great Britaine, France,* and now
Ireland Defender of the Faith, &c.

May it please your most Excellent Maiestie;



He whole Body of the *Natu-
rall Historie*, either designed
or written, by the late *Lord
Viscount S. Alban*, was dedica-
ted to your *Maiestie*, in his
Booke *De Ventis*, about foure yeeres past,
when your *Maiestie* was *Prince*: So as there
needed no new Dedication of this *Worke*,
but only, in all humbleness, to let your
Maiestie know, it is yours. It is true, if that
Lord had lived, your *Maiestie*, ere long, had
beene invoked, to the Protection of another
Historie;

The Epistle Dedicatorie.

Historie ; whereof, not *Natures Kingdome*, as in this, but these of your *Maiesties*, (during the Time and Raigne of King Henry the *Eighth*) had been the Subject: Which since it died under the Designation meekly, there is nothing left, but your *Maiesties* Princely Goodnesse, graciously to accept of the Vnder-takers Heart, and Intentions ; who was willing to have parted, for a while, with his Darling *Philosophie*, that he might have attended your Royall Commandement, in that other *Worke*. Thus much I have been bold, in all lowlinesse, to represent unto your *Maiestie*, as one that was trusted with his *Lordships Writings*, even to the last. And as this *Worke* affecteth the *Stampe* of your *Maiesties Royall Protection*, to make it more currant to the *World* ; So under the *Protection* of this *Worke*, I presume in all humblenesse to approach your *Maiesties* presence, And to offer it up into your *Sacred Hands*.

Your *MAIESTIES* most Loyall

and Devoted Subiect,

W. RAVVLEY.



To the Reader.

HAving had the Honour to bee continually with my *Lord*, in compiling of this *Worke*; And to bee employed there in; I have thought it not amisse, (with his Lordships good leave and liking,) for the better satisfaction of those that shall reade it, to make known somewhat of his Lordships Intentions, touching the Ordering, and Publishing of the same. I have heard his Lordship often say; that if he should have served the glory of his owne Name, hee had beene better not to have published this *Naturall History*: For it may seeme an Indigested Heap of Particulars; And cannot have that Lustre, which Bookes cast into Methods have: But that hee resolved to preferre the good of Men, and that which might best secure it, before any thing that might have Relation to Himselfe. And hee knew well, that there was no other way open, to unloose Mens mindes, being bound; and (as it were)

To the Reader.

Maleficiate, by the Charmes of deceiving
Notions, and Theories; and thereby made
Impotent for Generation of Workes; But
onely no where to depart from the Sense, and
cleare experience; But to keepe close to it,
especially in the beginning: Besides, this
Naturall History was a Debt of his, being
Designed and set downe for a third part of
the *Instauration*. I have also heard his Lord-
ship discourse, that Men (no doubt) will
think many of the *Experiments* contained in
this Collection, to be Vulgar and Triviall:
Meane and Sordid; Curious and Fruitlesse:
And therefore he wisheth, that they would
have perpetually before their Eyes, what is
now in doing; And the difference betweene
this *Naturall History*, and others. For those
Naturall Histories, which are Extant, being
gathered for Delight and Vse, are full of
pleasant Descriptions & Pictures; and affect
and seek after Admiracion, Rarities, and Se-
crets. But contrariwise, the Scope which his
Lordship intendeth, is to write such a *Nat-
urall History*, as may be Fundamentall to the
Erecting and Building of a true *Philosophy*:
For the Illumination of the *Understanding*; the
Extracting of *Axiomes*; and the producing of
many Noble Works, & Effects. For he hopeth,
by this meane, to acquit himselfe of that, for
which hee taketh *Himselfe* in a sort bound;
And

To the Reader.

And that is, the Advancement of all Learning and Sciences. For having in this present Work Collected the Materials for the Building; And in his *Novum Organum* (of which his Lordship is yet to publish a Second Part,) set down the Instruments and Directions for the Worke; Men shall now bee wanting to themselves, if they raise not Knowledge to that perfection, whereof the Nature of Mortall men is capable. And in this behalf, I have heard his Lo. speake complainingly; That his Lordship (who thinketh he deserveth to be an Architect in this building) should bee forced to bee a Work-man and a Labourer; And to digge the Clay, and burne the Brick; And more than that, (according to the hard Condition of the *Israelites* at the latter end) to gather the Straw and Stubble, over all the Fields, to burne the Bricks withall. For he knoweth, that except he doe it, nothing will be done: Men are so set to despise the meanes of their owne good. And as for the *Basenesse* of many of the Experiments, As long as they be Gods Works, they are honorable enough. And for the *Vulgarnes* of them, true *Axiomes* must be drawne from plain Experience, and not from doubtful, And his Lordships course is to make *VVonders* Plaine, and not Plaine things *Wonders*, And that Experience likewise must bee broken and grinded, and not whole,

To the Reader.

whole, or as it groweth. And for *Vse*; his Lordship hath often in his Mouth, the two kindes of *Experiments*; *Experimenta Fructifera*, and *Experimenta Lucifera*: *Experiments of Vse*, and *Experiments of Light*: And he reporteth himselfe, whether hee were not a strange Man, that should thinke that Light hath no *Vse*, because it hath no Matter. Further his Lordship thought good also, to adde unto many of the *Experiments* themselves, some *Glosse* of the *Causes*; that in the succeeding work of *Interpreting Nature*: and *Framing Axiomes*, all things may be in more readinesse. And for the *Causes* herein by Him assigned; his Lordship perswadeth Himself, they are farr more certaine, than those that are rendred by Others; Not for any Excellencie of his owne Wit, (as his Lordship is wont to say) but in respect of his continuall Conversation with *Nature*; and *Experience*. Hee did consider likewise, that by this addition of *Causes*, mens mindes (which make so much hast to finde out the *Causes* of things,) would not thinke themselves utterly lost, in a vast wood of *Experience*, but stay upon these *Causes*, (such as they are, a litle, till true *Axioms* may be more fully discovered. I have heard his Lordship say also, that one great reason, why he would not put these Particulars into any exact *Method*, (though hee that looketh attentively
into

To the Reader.

into them, shall finde that they have a secret Order) was because he conceived that other men would now think that they could do the like; And so goe on with a further Collection: which if the *Method* had beene Exact, many would have despaired to attaine by Imitation. As for his Lordships love of Order, I can referre any Man to his Lordships Latine Booke, *De Augmentis Scientiarum*; which (if my Judgement bee any thing) is written in the Exactest Order, that know any Writing to bee. I will conclude with an usuall Speech of his Lordships. That this Worke of his *Naturall History*, is the *World*, as GOD made it and not as Men have made it; For that it hath nothing of Imagination.

This Epistle is the same, that should have beene prefixed to this Booke, if his Lordship had lived.

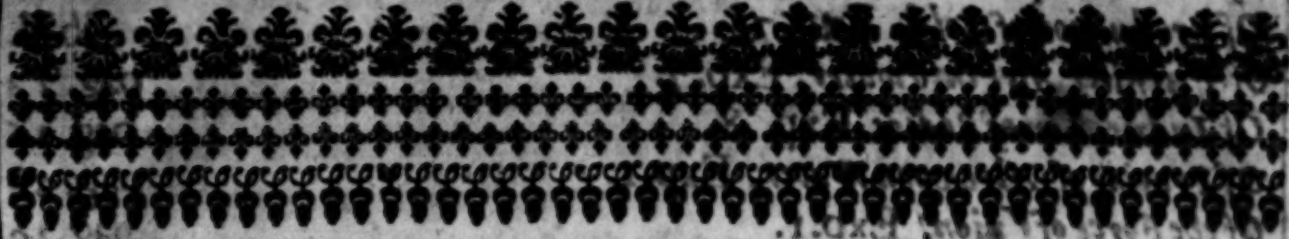
W: Rawley.

To the Reader.

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it: For that it hath nothing of Imagination.

This Epistle is
the same that
should have
been printed
at the end
of this
Booke, if his
Lordship had
lived.

W. Brouncker.



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FINIS.

NATVRALL HISTORIE.

I. Century.

DIGG a Pit upon the Sea shore, somewhat above the High-water Marke, and linke it as deepe as the Low-Water Marke; And as the Tide commeth in, it will fill with water, Fresh and Potable. This is commonly practized upon the Coast of *Barbary*, where other fresh water is wanting. And *Cesar* knew this well, when he was besieged in *Alexandria*: For by Digging of Pits in the Sea shore, hee did frustrate the Laborious Workes of the Enemies, which had turned the Sea water upon the Wells of *Alexandria*; And so saved his Army, being then in Desperation. But *Cesar* mistooke the Cause, For he thought that all Sea-Sandes had Naturall Springs of Fresh water. But it is plaine, that it is the Sea-water, because the Pit filleth according to the Measure of the Tide: And the Sea-water passing or Strayning through the Sandes, leaueth the Saltneffe.

I remember to have Read, that Triall hath bene made of Salt-water passed through *Earth*; through Ten Vessells, one within an other, and yet it hath not lost his Saltneffe, as to become potable: But the same Man saith, that (by the Relation of Another,) Salt water drained through twenty Vessells, hath become Fresh. This Experiment semeth to crosse that other of Pits, made by the sea side; And yet put in part, if it be true, that twenty Repetitions do the Effect. But it is worth the Note, how poore the Imitations of Nature are, in Common course of Experiments, except they be led by great Iudgement, and some good Light of Axiomes. For first, there is no small difference between a

Passage

Experiments
in Consort, touch-
ing the
Straining and
Passing of Bo-
dies, one
through ano-
ther: which
they Call Per-
colation.

Passage of *water* through twenty small Vessells; And through such a distance, as betwene the Low water and High water Marke. Secondly, there is a great difference betwene Earth and Sand. For all Earth hath in it a kinde of Nitrous Salt, from which Sand is more free: And besides Earth doth not straine the Water so finely, as Sand doth. But there is a Third Point, that I suspect as much, or more than the other Two; And that is, that in the Experiment of Transmission of the Sea-water into the Pits, the water riseth; But in the Experiment of Transmission of the water through the Vessells, it falleth: Now certaine it is, that the Salter Part of *water*, (once Salted throughout) goeth to the Bottome. And therefore no mervaille, if the Draining of *water* by descent, doth not make it fresh: Besides, I doe somewhat doubt, that the vera Dashing of the *water*, that commeth from the Sea, is more proper to strike of the Salt part, than where the *water* slideth of her owne Motion.

3

It seemeth *Percolation* or *Transmission*, (which is commonly called *Straining*;) is a good kinde of *Separation*, Not onely of Thicke from Thin, and Grosse from Fine; But of more subtile Natures; And varieth according to the Body through which the *Transmission* is made. As if through a wollen Bagg, the Liquour leaveth the Fatnesse; If through Sand, the Saltnesse, &c. They speake of Severing Wine from Water, passing it throug Ivy wood, or through other the like porous Body; But *Non Constat*.

4

The *Gumme* of Trees (which wee see to be commonly shining and cleare) is but a fine Passage or *Straining* of the Iuice of the Tree, through the Wood and Barke. And in like manner, *Cornish Diamonds*, and *Rock Rubies*, (which are yet more resplendent than *Gumms*) are the fine Exudations of *Stone*.

5

Aristotle giveth the Cause, vainely, why the *Feathers* of *Birds* are of more lively Colours, then the *Haires* of *Beasts*; for no *Beast* hath any fine Azure, or Carnation, or Greene *Haire*. He saith, It is, because *Birds* are more in the Beames of the Sunne, then *Beasts*; But that is manifestly untrue; For *Cattle* are more in the Sun than *Birds*, that live commonly in the Woods, or in some Covert. The true Cause is, that the Excrementious Moisture of living Creatures, which maketh as well the *Feathers* in *Birds*, as the *Haire* in *Beasts*, passeth in *Birds* through a finer and more delicate Strainer, than it doth in *Beastes*: For *Feathers* passe through Quills; And *Haire* through Skin.

6

The Clarifying of *Liquors* by Adhesion is an Inward *Percolation*; And is effected, when some Cleaving Body is Mixed and Agitated with the *Liquours*; whereby the grosser Part of the *Liquor* sticks to that Cleaving Body; And so the finer Parts are freed from the Grosser. So the *Apotecaries* clarify their *Sirrupes* by whites of Eggs, beaten with the Iuices which they would clarify; which Whites of Eggs, gather all the Dreggs and grosser Parts of the Iuice to them; And after the *Sirrup* being set on the Fire, the whites of Eggs themselves harden, and are

are taken forth. So *Ippocrasse* is clarified by mixing with Milke; And stirring it about; And then passing it through a Wollen Bagge, which they call *Hippocrates Sleeve*; And the Cleaving Nature of the Milke draweth the Powder of the Spices, and Groffer parts of the *Liquour* to it; And in the passage they stick upon the Woollen Bagge.

The *Clarifying* of *Water*, is an *Experiment* tending to Health; besides the pleasure of the Eye, when *water* is Crystalline. It is effected by casting in and placing Pebbles, at the Head of a Current; that the *Water* may straine through them.

It may be, *Percolation* doth not onely cause Clearenesse and Splendour, but Sweetnesse of Savour; For that also followeth, as well as Clearenes, when the Finer Parts are severed from the Groffer. So it is found, that the Sweates of Men that have much Heat, and exercise much, and have cleane Bodies, and fine Skins, doe smell sweet; As was said of *Alexander*; And we see, commonly, that *Gumms* have sweet Odours.

TAKE a *Glasse*, and put *Water* into it, and wet your Finger, and draw it round about the Lip of the *Glasse*, pressing it sumewhat hard; And after you have drawne it some few times about, it will make the *Water* friske and sprinkle vp, in a fine Dew. This *Instance* doth excellently Demonstrate the Force of *Compression* in a Solid Body. For whensoever a Solid Body (as Wood, Stone, Mettall, &c.) is pressed, ther is an inward Tumult in the parts thereof, seeking to deliver themselves from the Compression; And this is the Cause of all *Violent Motion*. Wherein it is strange in the highest Degree, that this *Motion* hath never been observed, nor inquired; It being of all *Motions*, the most Common, and the Chiefe Roote of all *Mechanicall Operations*. This *Motion* worketh in round at first, by way of Prooffe, and Search, which way to deliver it selfe; And then worketh in Progresse, where it findeth the Deliverance easiest. In *Liquors* this *Motion* is visible; For all *Liquours* stricken make round Circles, and withall Dash; but in *Solids*, (which breake not,) it is so subtile, as it is invisible; But nevertheless bewrayeth it selfe by many effects; as in this *Instance* whereof we speake. For the *Pressure* of the Finger furthered by the wetting (because it sticketh so much the better unto the Lip of the *Glasse*,) after some continuance, putteth all the small Parts of the *Glasse* into worke; that they strike the *water* sharply; from which *Percussion* that Sprinkling commeth.

If you strike or pierce a *Solid Body*, that is brittle, as *Glasse*, or *Suger*, it breaketh not onely, where the immediat force is; but breaketh all about into shivers and fitters; The *Motion*, upon the *Pressure*, searching all wayes; and breaking where it findeth the *Body* weakest.

The *Powder* in *Shot*, being Dilated into such a *Flame*, as endureth not *compression*; Moveth likewise in round, (The *Flame* being in the Natur of a *liquid Body*;) Sometimes recoyling; Sometimes breaking the *Piece*;

But

Experiments
in Confort
touching Mo-
tion of Bodies
upon their
Pressure.

9

10

11

But generally discharging the *Bullet*, because there it findeth easiest Deliverance.

12

This *Motion* upon *Pressure*, and the Reciprocall thereof, which is *Motion* upon *Tensure*; we vse to call (by one common Name) *Motion of Liberty*; which is, when any *Body*, being forced to a *Preter-Naturall* Extent, or Dimension, delivereth and restoreth it selfe to the *Naturall*: As when a *Blowne Bladder* (Pressed) riseth againe; or when *Leather* or *Gloath* tentured spring backe. These two *Motions* (of which there be infinite Instances,) we shall handle in due place.

13

This *Motion* upon *Pressure* is excellently also demonstrated in *Sounds*. As when one Chimeth upon a *Bell*, it soundeth; But as soon as he layeth his hand upon it, the *Sound* ceaseth: And so, the *Sound* of a *Virginal* *String*, as soone as the *Quill* of the *Iack* falleth upon it, stoppeth. For these *Sounds* are produced, by the subtile Percussion of the Minute parts, of the *Bell*, or *String*, upon the *Aire*; All one, as the *Water* is caused to leape by the subtile Percussion of the Minute parts of the *Glasse*, upon the *Water*, whereof we spake a little before in the 9th. *Experiment*. For you must not take it to be, the locall *Shaking* of the *Bell*, or *String*, that doth it. As well shall fully declare, when we come hereafter to handle *Sounds*.

Experiments
in Consort, touch-
ing Separations of Bo-
dies by weight.

14

Take a *Glasse* with a *Belly* and a long *Nebb*; fill the *Belly* (in part) with *Water*: Take also another *Glasse*, whereinto put *Claret Wine* and *Water* mingled, Reverse the first *Glasse*, with the *Belly* upwards Stopping the *Nebb* with your finger; Then dipp the Mouth of it within the Second *Glasse*, and remove your Finger: Continue it in that posture for a time; And it will unminge the *Wine* from the *Water*: The *Wine* ascending and setting in the topp of the upper *Glasse*; And the *Water* descending and setting in the bottome of the lower *Glasse*. The passage is apparent to the Eye; For you shall see the *Wine*, as it were, in a small veine, rising through the *Water*. For handsomnesse sake (because the Working requireth some small time) it were good you hang the upper *Glasse* upon a Naile. But as soone as there is gathered so much pure and unmixed *Water* in the Bottome of the Lower *Glasse*, as that the Mouth of the upper *Glasse* dippeth into it, the *Motion* ceaseth.

15

Let the Vpper *Glasse* be *Wine*, and the Lower *Water*; there followeth no *Motion* at all. Let the Upper *Glasse* be *Water* pure, the Lower *Water* coloured; or contrariwise; there followeth no *Motion* at all. But it hath beene tried, that though the Mixture of *Wine* and *Water*, in the Lower *Glasse*, be three parts *Water*, and but one *Wine*; yet it doth not dead the *Motion*. This Separation of *Water* and *Wine* appeareth to be made by *Weight*; for it must be of *Bodies* of unequall *Weight* or ells it worketh not; And the Heavier *Body* must ever be in the upper *Glasse* But then note withall, that the *Water* being made pensile, and ther being a great *Weight* of *Water* in the *Belly* of the *Glasse*, sustained by

by a small Pillar of *water* in the Neck of the *Glasse*; It is that, which setteth the *Motion* on worke: For *water* and *wine* in one *Glasse*, with long standing, will hardly sever.

This *Experiment* would be Extended from Mixtures of severall *Liquors*, to *Simple Bodies*, which Consist of severall Similare Parts: Try it therefore with *Broyne* or *Salt water*, and *Fresh water*: Placing the *Salt water* (which is the heavier) in the upper *Glasse*; And see whether the *Fresh* will come above. Try it also with *water thick Sugred*, and *Pure water*; and see whether the *water* which commeth above, will loose his Sweetnesse: For which purpose it were good there were a little Cock made in the Belly of the upper *Glasse*.

IN *Bodies* containing Fine Spirits, which doe easily dissipate, when you make *Infusions*, the Rule is; A short Stay of the *Body* in the *Liquour* receyveth the Spirit; And a longer Stay confoundeth it; because it draweth forth the Earthy Part withall; which embaseth the finer. And therefore it is an Errour in *Physicians*, to rest simply upon the Length of stay, for encreasing the vertue. But if you will have the *Infusion* strong, in those kind of *Bodies*, which have fine Spirits, your way is, not to give Longer time, but to repeat the *Infusion* of the *Body* oftner. Take *Violets*, and infuse a good Pugill of them in a Quart of Vineger; Lett them stay three quarters of an houre, and take them forth; And refresh the *Infusion* with like quantity of new *Violets*, seven times; And it will make a Vineger so fresh of the *Flower*, as if a Twelve-moneth after, it be brought you in a Saucer, you shall smell it before it come at you. Note, that it smelleth more perfectly of the *Flower*, a good while after, then at first.

This Rule, which we have given, is of singular use, for the Preparations of *Medicines*, and other *Infusions*. As for Example; the Lease of *Burrage* hath an Excellent Spirit, to repress the fuliginous Vapour of Dusky Melancholy, and so to cure Madnes: But neverthelesse, if the Lease be infused long, it yeeldeth forth but a raw substance, of no Vertue: Therefore I suppose, that if in the Must of Wine, or Wort of Beere, while it worketh, before it be Tunned, the *Burrage* stay a small time, and be often changed with fresh; It will make a Sovereigne Drink for Melancholy Passions. And the like I conceive of *Orenge Flowers*.

Rubarb hath manifestly in it Parts of contrary Operations: Parts that purge; And parts that binde the body: And the first lay looser, and the latter lay deeper: So that if you infuse *Rubarb* for an houre, and crush it well, it will purge better, and bind the Body lesse after the purging, than if it stood twenty foure houres; This is tried: But I conceive likewise, that by Repeating the *Infusion* of *Rubarb*, severall times, (as was said of *Violets*,) letting each stay in but a small time, you may make it as strong a *Purging Medicine*, as *Scammony*. And it is not a small thing wonn in *Physick*, if you can make *Rubarb*, and other *Mede-*

16

Experiments
in Consort
touching Iudi-
cious & Accu-
rate Infusions,
both in Li-
quors, and
Aire.

17

18

19

cines that are *Benedict*, as strong Purgers, as those that are not without some Malignity.

20

Purging Medicines, for the most part, have their *Purgative* Vertue, in a fine Spirit; As appeareth by that they indure not boiling, without much losse of vertue. And therefore it is of good use in *Physick*, if you can retaine the *Purging* Vertue, and take away the Unpleasant taste of the *Purger*; which it is like you may doe, by this Course of *Infusing* oft, with little stay. For it is probable, that the Horrible and Odious Taste, is in the Groffer part.

21

Generally, the working by *Infusions*, is grosse and blind, except you first try the Issuing of the severall Parts of the Body, which of them Issue more speedily, and which more slowly; And so by appportioning the time, can take and leave that Quality, which you desire. This to know, there be two waies; The one to try what long stay, & what short stay worketh, as hath been said; The other to try in Order, the succeeding *Infusions*, of one and the same Body, successively, in severall *Liquours*. As for example; Take *Orange-Pills*, or *Rose-Mary*, or *Cinnamon*, or what you will; And let them *Infuse* halfe an houre in *Water*; Then take them out; and *Infuse* them againe in other *Water*; And so the third time: And then taste and consider the *first Water*, the *Second*, and the *Third*: And you will find them differing, not only in Strength and Weaknes, but otherwise in Taste, or Odour; For it may bee the *First Water* will have more of the Sent, as more Fragrant; And the *Second* more of the Taste, as more bitter or Biting, &c.

22

Infusions in *Aire*, (for so we may well call *Odours*) have the same diversities with *Infusions* in *Water*; In that the severall *Odours* (which are in one Flower, or other Body) issue at severall times; Some earlier, some later: So we find that *Violets*, *woodbines*, *Strawberries*, yeeld a pleasing Sent, that commeth forth first; But soone after an ill Sent quite differing from the Former. Which is caused, not so much by Mellowing, as by the late Issuing of the Groffer Spirit.

23

As we may desire to extract the finest Spirits in some Cases; So we may desire also to discharge them (as hurtfull) in some other. So *wine burnt*, by reason of the Evaporating of the finer Spirit, enflameth lesse, and is best in Agues: *Opium* leeseeth some of his poisonous Quallity, if it be vapoured out, mingled with *Spirit of wine*, or the like: *Sean* leeseeth somewhat of his windines by Decocting; And (generally) subtile or windy Spirits are taken off by Incension, or Evaporation. And even in *Infusions* in things that are of too high a Spirit, you were better poure off the first *Infusion*, after a small time, and use the latter.

Experiment
Solitary touching the
Appetite of Continuation in
Liquids.

24

Bubbles are in the forme of an *Hemisphere*; *Aire* within, and a little Skin of *Water* without: And it seemeth somewhat strange, that the *Aire* should rise so swiftly, while it is in the *Water*; And when it commeth to the top, should be staid by so weake a Cover as that of the *Bubble* is. But as for the swift Ascent of the *Aire*, while it is under the

the *water*, that is a *Motion of Percussion* from the *water*; which it selfe descending, driveth up the *Aire*; and no *Motion of Levity* in the *Aire*. And this *Democritus* called *Motus Plage*. In this Common Experiment, the Cause of the Enclosure of the *Bubble* is, for that the Appetite to resist Separation, or Discontinuance, (which in solide *Bodies* is strong) is also in *Liquours*, though fainter and weaker; As wee see in this of the *Bubble*; we see it also in little Glasses of Spittle that children make of *Rushes*; And in Castles of Bubbles, which they make by blowing into *water*, having obtained a little Degree of Tenacity by Mixture of Soape: Wee see it also in the *Stillicides* of *water*, which if there be *water* enough to follow, will Draw themselves into a small thred, because they will not discontinue; But if there be no Remedy, then they cast themselves into round Drops; which is the Figure, that saveth the Body most from Discontinuance: The same Reason is of the Roundnes of the *Bubble*, as well for the Skin of *water*, as for the *Aire* within: For the *Aire* likewise avoideth Discontinuance; And therefore casteth it selfe into a round Figure. And for the stopp and Arrest of the *Aire* a little while, it sheweth that the *Aire* of it selfe hath little, or no Appetite, of Ascending.

THE Rejection, which I continually use, of Experiments, (though it appeareth not) is infinit; But yet if an Experiment be probable in the Worke, and of great Use, I receive it, but deliver it as doubtfull. It was reported by a Sober Man, that an Artificiall Spring may be made thus: Find out a hanging Ground, where there is a good quick Fall of Raine-water. Lay a Halfe-Trough of Stone, of a good length, 3: or 4. foote deepe within the same Ground; with one end upon the high Ground, the other upon the low. Cover the Trough with Brakes a good thicknes, and cast Sand upon the Top of the Brakes: You shall see, (saith he) that after some showers are past, the lower End of the Trough will run like a Spring of *water*: which is no marvaile, if it hold, while the Raine-water lasteth; But he said it would continue long time after the Raine is past: As if the water did multiply it selfe upon the *Aire*, by the helpe of the Coldnesse & Condensation of the Earth, and the Consort of the first Water.

THE *Fench*, (which put off the Name of the French Disease; unto the Name of the Disease of Naples,) doe report, that at the Siege of Naples, there were certaine wicked Merchants that Barrelled up Mans flesh, (of some that had beene lately slaine in *Barbary*) and sold it for Tunny; And that upon that foule and high Nourishment, was the Originall of that Disease. Which may well be; For that it is certaine, that the *Caniballs* in the *west Indies*, eat Mans flesh; And the *west Indies* were full of the Pockes when they were first discovered: And at this day the Mortalest poisons, practised by the *west Indians*, have some Mixture of the Bloud, or Fat, or Flesh of Man: And divers Witches, and

Experiment
Solitary touching the
Making of Artificiall
Springs.

25

Experiment
Solitary touching the
Venerious Quality
of Mans Flesh

26

Sorceresses, as well amongst the *Heathen*, as amongst the *Christians*, have fed upon *Mans flesh*, to aid (as it seemeth) their Imagination, with High and foule Vapours.

Experiment
Solitary tou-
ching the Versi-
on and Trans-
mutation of
Aire into
Water.

27

IT seemeth that there be these waies (in likelihood) of *Version* of *Vapours* or *Aire*, into *Water* and *Moisture*. The first is *Cold*; which doth manifestly *Condense*; As wee see in the *Contracting* of the *Aire* in the *weather-Glasse*; whereby it is a Degree nearer to *Water*. Wee see it also in the *Generation* of *Springs*, which the *Ancients* thought (very probably) to be made by the *Version* of *Aire* into *Water*, holpen by the *Rest*, which the *Aire* hath in those Parts; whereby it cannot dissipate. And by the *Coldnes* of *Rockes*; for there *Springs* are chiefly generated. Wee see it also in the Effects of the *Cold* of the *Middle Region* (as they call it) of the *Aire*; which produceth *Dews*, and *Raines*. And the Experiment of *Turning water* into *Ice*, by *Snow*, *Nitre*, and *Salt*, (whereof wee shall speake hereafter,) would be transferred to the *Turning* of *Aire* into *Water*. The Second way is by *Compression*; As in *Stillatories*, wher the *Vapour* is turned back, upon it selfe, by the *Encounter* of the *Sides* of the *Stillatory*; And in the *Dew* upon the *Covers* of *Boyling Pots*; And in the *Dew* towards *Raine*, upon *Marble*, and *wainscot*. But this is like to doe no great effect; Except it be upon *Vapours*, and grosse *Aire*, that are already very neere in Degree to *Water*. The Third is that, which may be searched into, but doth not yet appeare; which is, by *Mingling* of moist *Vapours* with *Aire*; And trying if they will not bring a *Returne* of more *water*, than the *water* was at first: For if so; That Increase is a *version* of the *Aire*: Therefore put *water* into the *Bottom* of a *Stillatory*, with the *Neb* stopped; Weigh the *water* first; Hang in the *Middle* of the *Stillatory* a large *Sponge*; And see what *Quantitie* of *water* you can crush out of it; And what it is more, or lesse, compared with the *water* spent; For you must understand, that if any *Version* can be wrought, it will be easiest done in small *Pores*: And that is the Reason why wee prescribe a *sponge*. The Fourth way is Probable also, though not Appearing; Which is, by *Receiving* the *Aire* into the small *Pores* of *Bodies*; For (as hath been said) every thing in small *Quantity* is more easie for *version*; And *Tangible Bodies* have no pleasure in the *Confort* of *Aire*, but endeavour to subact it into a more *Dense Body*: But in *Entire Bodies* it is checked; because if the *Aire* should *Condense*, there is nothing to succeed: Therefore it must be in loose *Bodies*, as *Sand*, and *Powder*; which wee see, if they lye close, of themselves gather *Moisture*.

Experiment
Solitary tou-
ching Helps
towards the
Beauty and
good Features
of Persons.

28

IT is reported by some of the *Ancients*; That *Whelps*, or other *Creatures*, if they be put Young, into such a *Cage*, or *Box*, as they cannot rise to their *Stature*, but may encrease in *Breadth*, or *length*; will grow accordingly, as they can get *Roome*: which if it be true, and faisible, and that the young *Creature* so pressed, and straightened,

tened, doth not therupon die ; It is a Meanes to produce *Dwarfe Creatures*, and in a very Strange figure. This is certaine, and noted long since ; That the Pressure or Forming of Parts of Creatures, when they are very young, doth alter the Shape not a little ; As the Stroaking of the Heads of Infants, between the Hands, was noted of Old, to make *Macrocephali* ; which shape of the Head, at that time, was esteemed. And the Raising gently of the Bridge of the Nose, doth prevent the Deformity of a Saddle Nose. Which observation well weighed, may teach a Meanes, to make the Persons of Men, and Women, in many kindes, more comely, and better featured, than otherwise they would be ; By the Forming and Shaping of them in their Infancy : As by Stroaking up the Calves of the Leggs, to keepe them from falling downe too lowe ; And by Stroaking up the Forehead to keepe them from being low-foreheaded. And it is a common Practice to swath Infants, that they may grow more straight, and better shaped : And wee see Young Women, by wearing straight Bodies, keepe themselves from being Grosse, and Corpulent.

O Nions, as they hang, will many of them shoot forth ; And so will *Penniroiall* ; And so will an Herb called *Orpin* ; with which they use, in the Country, to trimme their Houses, binding it to a Lath, or Stick, and setting it against a wall. Wee see it likewise, more especially, in the greater *Semper-vive*, which will put out Branches, two or three yeares : But it is true, that commonly they wrapp the Root in a Cloth besmeared with Oyle, and renue it once in halfe a Yeare. The like is reported by some of the *Ancients*, of the *Stalks of Lillies*. The Cause is ; For that these *Plants* have a Strong, Dense, and Succulent Moisture, which is not apt to exhale ; And so is able, from the old store, without drawing helpe from the Earth, to suffice the sprouting of the *Plant* : And this Sprouting is chiefly in the late Spring, or early Sommer ; which are the Times of Putting forth. Wee see also, that *Stumps of Trees*, lying out of the ground, will put forth Sprouts for a Time. But it is a Noble Trial, and of very great Consequence, to try whether these things, in the Sprouting, doe increase *Weight* ; which must be tried, by weighing them before they bee hangd up ; And afterwards againe, when they are sprouted. For if they encrease not in *weight* ; Then it is no more but this ; That what they send forth in the Sprout, they leese in some other Part : But if they gather *weight*, then it is *Magnale Nature* ; For it sheweth that *Aire* may bee made so to bee Condensed, as to bee converted into a *Dense Body* ; whereas the Race and Period of all things, here above the Earth, is to extenuate and turne things to bee more *Pneumaticall*, and Rare, And not to bee Retrograde, from *Pneumaticall* to that which is *Dense*. It sheweth also, that *Aire* can *Nourish* ; which is another great Matter of Consequence. Note, that to try this, the Experiment of the *Semper-vive* must bee made without Oiling the Cloth ; For else, it may be, the *Plant* receiveth Nourishment from the Oile.

Experiments
Solitary touch-
ing the Con-
densing of Aire,
in such sort as
it may put on
weight, and
yeeld Nourish-
ment.

Experiment
Solitary tou-
ching the Com-
mixture of
Flame and
Aire, and the
great Force
thereof.

30

Experiment
Solitary tou-
ching the Com-
mixture of
Flame and
Aire, and the
great Force
thereof.

31

Experiment
Solitary tou-
ching the Se-
cret Nature
of Flame.

31

Flame and Aire doe not Mingle, except it be in an *Instant*; Or in the *Vitall Spirits* of vegetables, and living Creatures. In *Gunpowder*, the Force of it hath beene ascribed, to Rarefaction of the Earthy Substance into *Flame*; And thus farre it is true: And then (forsooth) it is become another Element; the Forme whereof occupieth more place; And so, of Necessity, followeth a Dilatation: And therefore, lest two Bodies should be in one place, there must needes also follow an Expulsion of the pellet; Or Blowing up of the Mine. But these are Crude and Ignorant Speculations. For *Flame*, if there were nothing els, except it were in very great quantity, will bee suffocate with any hard Body, such as a Pellet is, Or the Barrell of a Gunn; So as the *Flame* would not expell the hard Body; But the hard Body would kill the *Flame*, and not suffer it to kindle, or spread. But the Cause of this so potent a Motion, is the *Nitre*, (which wee call otherwise *Salt-Petre*;) which having in it a notable Crude and windy Spirit, first by the Heate of the *Fire* suddainly dilateth it self; (And wee know that simple *Aire*, being preternaturally attenuated by Heate, will make it selfe Roome, and breake and blow vp that which resisterh it;) And Secondly, when the *Nitre* hath dilated it self, it bloweth abroad the *Flame*, as an inward Bellows. And therefore we see that *Brimstone*, *Pitch*, *Camphire*, *wilde-Fire*, and divers other Inflammable Matters, though they burne cruelly, and are hard to quench; Yet they make no such fiery winde, as *Gunpowder* doth: And on the other side, wee see that *Quick-Silver*, (which is a most Crude and Warry Body) heated, and pent in, hath the like force with *Gunpowder*. As for living Creatures, it is certaine, their *Vitall Spirits* are a Substance Compounded of an *Airy* and *Flamy* Matter; And though *Aire* and *Flame* being free, will not well mingle; yet bound in by a Body that hath some fixing, they will. For that you may best see in those two Bodies, (which are their *Aliments*,) *water*, and *Oyle*: For they likewise will not well mingle of themselves, but in the Bodies of *Plants*, and *Living Creatures*, they will. It is no marvaile therefore, that a small Quantity of *Spirits*, in the Cells of the Braine, and Cannales of the Sinewes, are able to moue the whole Body, (which is of so great Masse,) both with so great Force, as in Wrestling, Leaping; And with so great Swiftnes, As in playing Division upon the *Lute*. Such is the force of these two Natures, *Aire* and *Flame*, when they incorporate.

Take a small *wax Candle*, and put it in a Socket, of Brasse, or Iron; Then sett it upright in a Porringer full of *Spirit of Wine*, heated: Then sett both the *Candle*, and *Spirit of Wine*, on fire, and you shall see the *Flame* of the *Candle*, open it self, and become 4. or 5. times bigger than otherwise it would have been; and appeare in Figure *Globular*, and not in *Piramis*. You shall see also, that the Inward *Flame* of the *Candle* keepeth Colour, and doth not waxe any whitt blew towards the Colour of the Outward flame of the *Spirit of wine*. This is a Noble Instance;

Instance; wherein two things are most remarkable; The one; that one *Flame* within another quencheth not; but is a fixed Body, and continueth as *Aire*, or *Water* doe. And therefore *Flame* would still ascend upwards in one greatnesse, if it were not quenched on the *Sides*: And the greater the *Flame* is at the *Bottome*, the higher is the *Rise*. The other, that *Flame* doth not mingle with *Flame*, as *Aire* doth with *Aire*, or *Water* with *Water*, but only remaineth contiguous, As it commeth to passe betwixt Consisting Bodies. It appeareth also, that the forme of a *Piramis* in *Flame*, which we vsually see, is meerely by Accident, and that the *Aire* about, by quenching the *Sides* of the *Flame*, crusheth it, and extenuateth it into that *Forme*; For of it selfe it would bee *Round*: And therefore *Smoake* is in the *Figure* of a *Piramis* Reversed; For the *Aire* quencheth the *Flame*, and receiveth the *Smoake*. Note also, that the *Flame* of the *Candle*, within the *Flame* of the *Spirit of Wine*, is troubled; And doth not onely open and move upwards, but moveth waving, and to and fro: As if *Flame* of his owne Nature (if it were not quenched,) would rowle and turne, as well as move upwards. By all which it, it should seeme, that the *Cælestiall* Bodies, (most of them,) are true *Fires* or *Flames*, as the *Stoicks* held; More fine (perhaps) and *Rarified*, than our *Flame* is. For they are all *Globular*, and *Determinate*; They have *Rotation*; And they have the *Colour* and *Splendour* of *Flame*: So that *Flame* above is *Durable*, and *Consistent*, and in his *Naturall* place; But with us, it is a *Stranger*, and *Momentany*, and *Impure*; Like *Vulcan* that halted with his *Fall*.

Take an *Arrow*, and hold it in *Flame*, for the space of ten pulses; And when it commeth forth, you shall finde those *Parts* of the *Arrow*, which were on the *Outsides* of the *Flame*, more burned, blacked, & turned almost into a *Coale*; whereas that in the *Middest* of the *Flame*, will be, as if the *Fire* had scarce touched it. This is an *Instance* of great consequence for the discovery of the Nature of *Flame*; And sheweth manifestly, that *Flame* burneth more violently towards the *Sides*, than in the *Middest*: And, which is more, that *Heat* or *Fire* not violent or furious, but where it is checked and pent. And therefore the *Peripateticks* (howsoever their opinion of an *Element* of *Fire* above the *Aire* is justly exploded;) in that *Point* they acquit themselves well: For being opposed, that if there were a *Sphere* of *Fire*, that incompassed the *Earth* so neare hand, it were impossible but all things should be burnt up; They answer, that the pure *Elementall* *Fire*, in his owne place, and not irritate, is but of a *Moderate* *Heat*.

It is affirmed constantly by māy, as an usuall Experiment; That a *Lumpe* of *Vre*, in the *Bottome* of a *Mine*, will bee tumbled, and stirred, by two Mens strength; which if you bring it to the *Topp* of the *Earth*, will aske Six Mens strength at the least to stirre it. It is a *Noble Instance*, and is fit to be tried to the full: For it is very probable, that the *Motion*

Experiment
Solitary touching the
Different force of
Flame in the
Middest and on
the Sides.

32

Experiment
Solitary touching the
Decrease of the
Natural motion
of Gravity in
great distance
from the Earth;
or within some
depth of the
Earth.

33

of *Gravitie* worketh weakly, both farre from the Earth, and also within the Earth: The former, because the Appetite of Union of Dense Bodies with the Earth, in respect of the distance, is more dull; The latter, because the Body hath in part attained his Nature, when it is some Depth in the Earth. For as for the Moving to a *Point* or Place (which was the Opinion of the *Ancient*) it is a meere Vanity.

Experiment
Solitary touching the
Contraction of Bodies
in Bulke, by the Mixture of
the more Liquid Body with
the more Solid.

34

IT is strange, how the *Ancients* tooke up *Experiments* upon credit, and yet did build great Matters upon them. The Observation of some of the best of them, delivered confidently is, That a *Vessell* filled with *Asbes*, will receive the like quantity of *water*, that it would have done, if it had been empty. But this is utterly untrue; for the *water* will not goe in by a Fifth part. And I suppose, that that Fifth part is the difference of the lying close, or open, of the *Asbes*; As wee see that *Asbes* alone, if they be hard pressed, will lye in lesse roome: And so the *Asbes* with Aire betweene, lye looser; and with *water*, closer. For I have not yet found certainly, that the *water*, it selfe, by mixture of *Asbes*, or *Dust*, will shrinke or draw into lesse Roome.

Experiment
Solitary touching the
Making Vines
more fruitfull.

35

IT is reported of credit, that if you lay good store of *Kernells* of *Grapes*, about the *Root* of a *Vine*; it will make the *Vine* come earlier and prosper better. It may bee tried with other *Kernells*, laid about the *Root* of a *Plant* of the same kinde; As *Figgs*, *Kernells* of *Apples*, &c. The Cause may bee, for that the *Kernells* draw out of the Earth Juice fit to nourish the *Tree*, as those that would be *Trees* of themselves, though there were no *Root*; But the *Root* being of greater strength, robbeth and devourerth the Nourishment, when they have drawne it: As great *Fishes* devour little.

Experiments
in Consort
touching Purging
Medicines.

36

THE Operation of *Purging Medicines*, and the Causes thereof, have been thought to be a great Secret; And so according to the slothfull manner of Men, it is referred to a *Hidden Propriety*, a *Specificall vertue*, and a *Fourth Qualitie*, and the like Shifts of Ignorance. The Causes of *Purging* are diuers; All plaine and perspicuous; And thoroughly maintained by Experience. The first is, That whatsoever cannot bee overcome and digested by the *Stomacke*, is by the *Stomacke*, either put up by *Vomit*, or put downe to the *Guts*; And by that Motion of *Expulsion* in the *Stomacke*, and *Guts*, other *Parts of the Body*, (as the *Orifices* of the *Veines*, and the like) are moved to expell by *Consent*. For nothing is more frequent than Motion of *Consent* in the Body of Man. This Surcharge of the *Stomacke*, is caused either by the *Qualitie* of the *Medicine*, or by the *Quantitie*. The *Qualities* are three: *Extreme Bitter*, as in *Aloës*, *Coloquintida*, &c. *Loathsome* and of horrible tast; As in *Agarick*, *Black Hellebore*, &c. And of secret *Malignity*, and disagreement towards *Mans Bodie*, many times not appearing much in the Taste; As in *Scammony*, *Mechaoacham*, *Antimony*, &c. And note well, that if there be any *Medicine* that

that *Purgeth*, and hath neither of the first two *Manifest Qualities*; it is to bee held suspected, as a kinde of *Poyson*; For that it worketh either by *Corrosion*; or by a *secret Malignitie* and *Enmitie* to *Nature*: And therefore such *Medicines* are warily to bee prepared, and used. The *Quantitie* of that which is taken, doth also cause *Purging*; As wee see in a great *Quantitie* of *New Milke* from the Cow; yea and a great *Quantitie* of *Meat*; For *Surfets* many times turne to *Purges*, both upwards, and downwards. Therefore we see generally, that the working of *Purging Medicines*, commeth two or three houres after the *Medicines* taken; For that the *Stomacke* first maketh a prooffe, whether it can concoct them. And the like happeneth after *Surfets*; Or *Milke* in too great *Quantitie*.

A second Cause is *Mordication* of the *Orifices* of the *Parts*; Especially of the *Mesentery veines*; As it is seene, that *Salt*, or any such thing that is sharpe and biting, put into the *Fundament*, doth provoke the *Part* to expell; And *Mustard* provoketh *Sneezing*: And any Sharpe Thing to the *Eyes*, provoketh *Teares*. And therefore we see that almost all *Purgers* have a kinde of *Twitching* and *vellication*, besides the *Gripping* which commeth of wind. And if this *mordication* bee in an ouer-high Degree, it is little better than the *Corrosion* of *Poyson*; And it commeth to passe sometimes in *Antimony*; Especially if it be given, to Bodies not repleat with *Humors*; For where *Humors* abound, the *Humors* save the *Parts*.

The third Cause is *Attraction*: For I doe not deny, but that *Purging Medicines* have in them a direct Force of *Attraction*; As *Drawing Plasters* have in *Surgery*: And wee see *Sage*, or *Bettony* bruised, *Sneezing-powder*, and other *Powders* or *Liquors* (which the *Physicians* call *Errhines*), put into the *Nose*, draw *Flegme*, and water from the *Head*; And so it is in *Apophlegmatismes*, and *Gargarismes*, that draw the *Rheume* downe by the *Pallate*. And by this Vertue, no doubt, some *Purgers* draw more one *Humour*, and some another, according to the *Opinion* received: As *Rubarb* draweth *Choller*; *Sean* *Melancholy*; *Agarick* *Flegme*; &c. But yet, (more or lesse) they draw promiscuously. And note also, that besides *Sympathy*, between the *Purger* and the *Humour*, there is also another Cause, why some *Medicines* draw some *Humour* more than another. And it is, for that some *Medicines* work quicker than others: And they that draw quick, draw only the *Lighter*, and more *fluide* *Humours*; they that draw slow, worke upon the more *Tough*, and *Viscous* *Humours*. And therefore Men must beware, how they take *Rubarb*, and the like, alone, familiarly, For it taketh onely the *Lightest* part of the *Humour* away, and leaveth the *Masse* of *Humours* more obstinate. And the like may be said of *Worme-wood*, which is so much magnified.

The fourth Cause is *Flatuosity*; For *wine* stirred moveth to expell: And wee finde that (in effect) all *Purgers* have in them a raw *Spirit*, or *wind*; which is the *Principall Cause* of *Tortion* in the *Stomach*, and *Belly*. And therefore *Purgers* leese (most of them) the vertue, by *Decoction* upon the *Fire*; And for that Cause are given chiefly in *Infusion*, *Juyce*, or *Powder*.

The

40

The fifth Cause is *Compression*, or *Crushing*: As when *Water* is Crushed out of a *sponge*: So we see that *Taking Cold* moveth Loosenesse by Contraction of the skinn, and outward Parts; And so doth *Cold* likewise cause Rheumes, and Defluxions from the Head; And some *Astringent Plasters* crush out purulent Matter. This kind of Operation is not found in many *Medicines*: *Mirabolanes* have it; And it may bee the *Barkes of Peaches*; For this Vertue requireth an *Astriction*; but such an *Astriction*, as is not gratefull to the Body; (For a pleasing *Astriction* doth rather Binde in the Humours, than Expell them:) And therefore such *Astriction* is found in Things of an Harsh Taste.

41

The Sixth Cause is *Lubrefaction*, and *Relaxation*. As wee see in *Medicines Emollient*; Such as are *Milke*, *Honey*, *Mallows*, *Lettuce*, *Mercuriall*, *Pelletory of the Wall*, and others. There is also a secret Vertue of *Relaxation* in *Cold*: For the *Heat* of the Body bindeth the Parts and Humours together, which *Cold*, relaxeth: As it is seene in *Vrine*, *Bloud*, *Pottage*, or the like; which, if they be *Cold*, Breake, and dissolve. And by this kinde of *Relaxation*, *Fear* looseth the Belly; because the Heat retiring inwards towards the Heart, the Guts and other Parts are relaxed; In the same manner as *Fear* also causeth Trembling in the Sinewes. And of this Kinde of *Purgers* are some *Medicines* made of *Mercury*.

42

The Seventh Cause is *Absterision*; which is plainly a *Scouring off*, or *Incision* of the more viscom Humors, and making the *Humors* more fluide; And Cutting betweene them, and the Part. As is found in *Nitrous Water*, which scoureth Linnen Cloth (Speedily) from the Foulness. But this *Incision* must bee by a *Sharpness*, without *Astriction*: Which wee finde in *Salt*, *Worm-wood*, *Oxymel*, and the like.

43

There bee *Medicines*, that move *Stooles*, and not *Vrine*; Some other, *Vrine*, and not *Stooles*. Those that *Purge by Stooles*, are such as enter not at all, or little into the *Mesentery Veines*; But either at the first are not digestible by the *Stomach*, and therefore move immediatly downwards to the *Guts*; Or else are afterwards rejected by the *Mesentery Veines*, and so turne likewise downwards to the *Guts*; and of these two kinds are most *Purgers*. But those that move *Vrine*, are such, as are well digested of the *Stomach*, and well received also of the *Mesentery Veines*; So they come as farre as the *Liver*, which sendeth *Vrine* to the *Bladder*, as the *Whey of Bloud*: And those *Medicines* being Opening and Piercing, doe fortifie the Operation of the *Liver*, in sending downe the wheyey Part of the *Bloud* to the *Reines*. For *Medicines Vrinative* doe not worke by Rejection, and Indigestion, as *Solutive* doe.

44

There bee divers *Medicines*, which in greater *Quantity*, move *Stooles*, and in smaller, *Vrine*: And so contrariwise, some that in greater *Quantity*, move *Vrine*, and in Smaller, *Stooles*. Of the former sort is *Rubarb*, and some others. The Cause is, for that *Rubarb* is a *Medicine*, which the *Stomach* in a small *Quantity* doth digest, and overcome, (being not Flatuous, nor Loathsome;) and so sendeth it to the *Mesentery Veines*; And so being opening, it helpeth downe *Vrine*: But in a greater *Quantitie*, the

the *Stomach* cannot overcome it, and so it goeth to the *Gutts*. *Pepper* by some of the *Ancients* is noted to bee of the second sort; which being in small *Quantity*, moveth wind in the *Stomach* and *Gutts*, and so expelleth by *Stoole*; But being in greater *Quantity*, dissipateth the *wind*; And it selfe getteth to the *Mesenterie veines*; And so to the *Liver*, and *Reines*; where, by Heating and Opening, it sendeth downe *Vrine* more plentifully.

WE have spoken of *Evacuating* of the *Body*; we wil now speak something of the *Filling* of it by *Restoratives* in *Consumptions*, and *Emaciating Diseases*. In *Vegetables*, there is one Part that is more *Nourishing* than an other, As *Graines*, and *Roots* nourish more, than the *Leaves*; In so much as the *Order* of the *Foliatanes* was put downe by the *Pope*, as finding *Leaves* unable to *Nourish* Mans *Body*. Whether there be that difference in the *Flesh* of *Living Creatures*, is not well inquired: As whether *Livers*, and other *Entrails*, be not more *Nourishing*, than the *Outward Flesh*. We find that amongst the *Romans*, a *Gooses Liver* was a great *Delicacy*; In so much as they had *Artificiall* Meanes to make it faire, and great; But whether it were more *Nourishing*, appeareth not. It is certaine, that *Marrow* is more *Nourishing* than *Fat*. And I conceive that some *Decoction* of *Bones*, and *Sinewes*, stamped, and well strained, would bee a very *Nourishing Broth*: Wee finde also that *Scotch Skinck*, (which is a *Pottage* of strong *Nourishment*,) is made with the *Knees*, and *Sinewes* of *Beefe*, but long boiled: *Jelly* also, which they vse for a *Restorative*, is chiefly made of *Knuckles* of *Veale*. The *Pulp* that is within the *Crawfish* or *Crab*, which they spice and butter, is more *Nourishing* than the *Flesh* of the *Crab*, or *Crawfish*. The *Yolkes* of *Egges* are clearly more *Nourishing* than the *whites*. So that it should seeme, that the *Parts* of *Living Creatures*, that lye more *Inwards*, nourish more than the *Outward Flesh*: Except it bee the *Braine*; which the *Spirits* prey too much upon, to leave it any great *Vertue* of *Nourishing*. It seemeth for the *Nourishing* of *Aged Men*, or *Men* in *Consumptions*, some such thing should be *Devised*, as should be halfe *Chylus*, before it be put into the *Stomach*.

Experiments
in Confort
touching
Meats and
Drinks that are
most Nourishing.

45

Take two large *Capons*; perboile them upon a soft fire, by the space of an houre, or more, till in effecte all the *Bloud* be gone. Adde in the *Decoction* the *Pill* of a *Sweet Limon*, or a good part of the *Pill* of a *Citron*, and a little *Mace*. Cut off the *Shankes*, and throw them away. Then with a good strong *Chopping-knife*, mince the two *Capons*, bones and all, as small as ordinary *Minced Meat*; Put them into a large neat *Boulter*; Then take a *Kilderkin*, sweet, and well seasoned, of foure gallons of *Beere*. of 8. 3. strength, new as it commeth from the *Tunning*; Make in the *Kilderkin* a great *Bung-hole* of purpose: Then thrust into it, the *Boulter* (in which the *Capons* are) drawne out in length; Let it steepe in it thre *Dayes*, and three *Nights*, the *Bung-hole* open, to worke; Then close the *Bung-hole*, and so let it continue, a *Day* and an halfe; Then draw

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draw it into bottles, and you may drinke it well after three dayes Botteling; And it will last six weeks (approved.) It drinketh fresh, flowreth and mantleth exceedingly; It drinketh not newesh at all; It is an excellent Drinke for a Consumption, to be drunke either alone, or Carded with some other Beere. It quencheth Thirst, and hath no whit of windinesse. Note, that it is not possible, that Meat and Bread, either in Broths, or taken with Drink, as is used, should get forth into the veines, and outward Parts, so finely, and easily, as when it is thus Incorporate, and made almost a *chylus* aforehand.

47

Triall would bee made of the like Brew with *Porado Roots*, or *Burr Rootes*, or the *Pitb* of *Artichokes*, which are nourishing Meats: It may be tried also, with other flesh; As *Pheasant*, *Partridge*, *Young Porke*, *Pigge*, *Venison*, especially of *young Deere*, &c.

48

A *Mortresse* made with the *Browne* of *Capons*, stamped, and strained, and mingled (after it is made) with like quantitie, (at the least,) of *Almond Butter*; is an excellent Meat to Nourish those that are weake, Better than *Blanck-Manger*, or *Jelly*: And so is the *Cullice* of *Cockes*, boyled thicke with the like Mixture of *Almond Butter*: For the *Mortresse*, or *Cullice*, of it selfe, is more Savoury and strong; And not so fit for Nourishing of weake Bodies; But the *Almonds* that are not of so high a taste as *Flesh*, doe excellently qualifie it.

49

Indian Maiz hath (of certaine) an excellent Spirit of Nourishment; But it must bee thoroughly boyled, and made into a *Maiz-Cream* like a *Barley Cream*. I judge the same of *Rize*, made into a Cream; For *Rize* is in *Turky*, and other Countries of the East, most fed upon; But it must be thoroughly boyled in respect of the Hardnesse of it: And also because otherwise it bindeth the Body too much.

50

Pistachoes, so they be good, and not musty, joyned with *Almonds* in *Almond Milke*; Or made into a *Milke* of themselves, like unto *Almond Milke*, but more Greene, are an excellent Nourisher. But you shall doe well, to adde a little *Ginger*, scraped, because they are not without some subtil windinesse.

51

Milke warme from the Cow, is found to be a great Nourisher, and a good Remedy in *Consumptions*: But then you must put into it, when you milke the Cowe, two little bagges; the one of *Powder of Mint*, the other of *Powder of Red Roses*; For they keepe the *Milke* somewhat from Turning, or Crudling in the stomach; And put in *Suggar* also, for the same cause, and partly for the Taste sake; But you must drinke a good draught that it may stay lesse time in the stomach, lest it Cruddle: And let the Cup into which you milke the Cow, bee set in a greater Cup of hot water, that you take it warme. And *Cow-milke* thus prepared, I judge to be better for a *Consumption*, than *Ass-milke*, which (it is true) turneth not so easily, but it is a little harrish; Marry it is more proper for Sharpnesse of *Vrine*, and Exulceration of the Bladder, and all manner of Lenifyings. *womans milke* likewise is prescribed, when all faile; but I commend it not; as being a little too neere the *Juyce* of Mans Body;

dy, to bee a good Nourisher; Except it be in *Infants*, to whom it is Naturall.

Oyle of Sweet *Almonds*, newly drawne, with *Sugar*, and a little *Spice*, spread upon Bread toasted, is an Excellent Nourisher; But then to keepe the Oyle from frying in the Stomach, you must drinke a good draught of Milde Beere after it; And to keepe it from relaxing the Stomach too much; you must put in a little Powder of Cinnamon.

The Yolkes of *Egges* are of themselves so well prepared by Nature for Nourishment; As (so they be Potched, or Reare boiled) they need no other Preparation, or Mixture; yet they may be taken also rawe, when they are new laid, with *Malmesey*, or Sweet wine; You shall doe well to put in some few Slices of *Eryngium Roots*, and a little *Amber-grice*; For by this meanes, besides the immediate Facultie of Nourishment, such Drinke will strengthen the Backe; So that it will not draw downe the *Vrine* too fast; For too much *Vrine* doth alwaies hinder Nourishment.

Mixing of meat, as in *Pies*, and buttered Minced Meat, saveth the Grinding of the Teeth; And therefore, (no doubt) it is more Nourishing; Especially in Age, Or to them that have weake Teeth; But the Butter is not so proper for weake Bodies; And therefore it were good to moisten it with a little *Claret wine*, Pill of *Limon*, or *Orange*, cut small, *Sugar*, and a very little *Cinnamon*, or *Nutmegg*. As for *Chuetts*, which are likewise minced Meat, in stead of Butter, and Fat, it were good to moisten them, partly with *Creame*, or *Almond*, or *Pistachomilke*; or *Barley*, or *Maiz Creame*; Adding a little *Coriander Seed*, and *Carraway Seed*, and a very little *Saffron*. The more full Handling of *Alimentation* we reserve to the due place.

Wee have hitherto handled the Particulars which yeeld best, and easiest, and plentifullest Nourishment; And now wee will speake of the best Meanes of Conveying, and Converting the Nourishment.

The First Meanes is, to procure that the Nourishment may not be robbed, and drawen away; wherein that, which we have already said, is very Materiall; To provide, that the *Reines* draw not too strongly an over-great Part of the *Bloud* into *Vrine*. To this adde that Precept of *Aristotle*, that *Wine* be forborne in all *Consumptions*; For that the *Spirits* of the wine, doe prey upon the *Roside Juyce* of the Body, and inter-common with the *Spirits* of the Body, and so deceive and robbe them of their Nourishment. And therefore if the *Consumption* growing from the weaknesse of the Stomach, doe force you to use *Wine*; let it alwaies be burnt, that the Quicker *Spirits* may evaporate; or at the least quenched with two little wedges of *Gold*, six or seven times repeated. Adde also this Provision, That there be not too much *Expence* of the Nourishment, by *Exhaling*, and *Sweating*: And therefore if the Patient be apt to sweat, it must be gently restrained. But chiefly *Hippocrates* Rule is to bee followed; who adviseth quite contrary to that which is in use: Namely, that the *Linnen*, or *Garment* next the *Flesh*, be in Winter drie, and oft changed;

changed; And in Summer seldome changed, and smeared over with Oyle; For certaine it is, that any Substance that is fat, doth a little fill the Pores of the Body, and stay Sweat, in some Degree. But the more cleanly way is, to have the *Linnen* smeared lightly over, with Oyle of *Sweet Almonds*; And not to forbear shifting as oft as is fit.

56 The Second *Meanes* is, to send forth the *Nourishment* into the *Parts*, more strongly; For which, the working must be by *Strengthening* of the *Stomach*; And in this, because the *Stomach* is chiefly comforted by *wine*, and *Hot things*, which otherwise hurt; it is good to resort to *Outward Applications* to the *Stomach*: Wherein it hath beene tried, that the *Quilts* of *Roses*, *Spices*, *Mastick*, *wormewood*, *Mint*, &c. are nothing so helpfull, as to take a *Cake* of *New bread*, and to bedew it with a little *Sack*, or *Ale-gant*; And to drie it; And after it bee dried a little before the Fire, to put it within a cleane Napkin, and to lay it to the *Stomach*: For it is certaine, that all Flower hath a potent Vertue of *Astriction*; In so much as it hardeneth a peece of flesh, or a Flower that is laid in it: And therefore a *Bagge* quilted with *Bran*, is likewise very good; but it drieth somewhat too much; and therefore it must not lye long.

57 The Third *Meanes* (which may be a Branch of the former) is to send forth the *Nourishment* the better by *Sleepe*. For we see, that Beares, and other *Creatures* that *sleepe* in the Winter, wax exceeding fat: And certaine it is, (as it is commonly beleevd) that *Sleepe* doth Nourish much; Both for that the *Spirits* doe lesse spend the *Nourishment* in *Sleepe*, than when living *Creatures* are awake: And because (that which is to the present purpose) it helpeth to thrust out the *Nourishment* into the *Parts*. Therefore in Aged men, and weake Bodies, and such as abound not with Choller, a short *Sleepe* after dinner doth helpe to Nourish; For in such Bodies there is no feare of an over-hastie Digestion, which is the Inconvenience of *Postmeridian sleepes*, *Sleepe* also in the Morning after the taking of somewhat of easie Digestion; As *Milke* from the Cow, *Nourishing Broth*, or the like; doth further Nourishment: But this would bee done, sitting upright, that the *Milke* or *Broth* may passe the more speedily to the bottome of the *Stomach*.

58 The Fourth *Meanes* is to provide that the *Parts* themselves may draw to them the *Nourishment* strongly. There is an Excellent Observation of *Aristotle*; That a great reason, why plants (some of them) are of greater Age, than *Living Creatures*, is, for that they yearely put forth new Leaves, and Boughes; whereas *Living Creatures* put forth (after their Period of Growth,) nothing that is young, but Haire and Nailes; which are Excrements, and no *Parts*. And it is most certaine, that whatsoever is young, doth draw *Nourishment* better, than that which is Old; And then (that which is the Mystery of that Observation) young Boughes, and Leaves, calling the Sap up to them; the same Nourisheth the *Body*, in the Passage. And this wee see notably proved also, in that the oft cutting, or Polling of *Hedges*, *Trees*, and *Herbs*, doth conduce much to their Lasting. Transfere therefore this Observation to the

Helping

Helping of Nourishment in *Living Creatures*: The Noblest and Principall Use whereof is, for the *Prolongation of Life*; *Restauration* of some Degree of *Youth*; and *Inteneration* of the *Parts*: For certaine it is, that there are in *Living Creatures* Parts that Nourish, and Repaire easily; And Parts that Nourish and repaire hardly, And you must refresh, and renew those that are easie to Nourish, that the other may bee refreshed, and (as it were) Drinke in Nourishment, in the Passage. Now wee see that *Draught Oxen*, put into good Pasture, recover the Flesh of young Beeffe; And Men after long Emaciating Diets, wax plumpe, and fat, and almost New: So that you may surely conclude, that the frequent and wise Use of those *Emaciating Diets*, and of *Purgings*; And perhaps of some kinde of *Bleeding*; is a principall Meanes of *Prolongation of Life*; and *Restoring* some Degree of *Youth*: For as wee have often said, *Death* commeth upon *Living Creatures* like the Torment of *Mezentius*.

*Mortua quinetiam jungebat Corpora vivis,
Componens Manibusq; Manus, atq; Oribus Ora.*

For the Parts in Mans Body easily reparable, (as *Spirits*, *Bloud*, and *Flesh*) die in the Embrace of the Parts hardly reparable, (as *Bones*, *Nerves*, and *Membranes*;) And likewise some *Entrails* (which they reckon amongst the *Spermatick* Parts) are hard to repaire: Though that Division of *Spermatick*, and *Menstruall* Parts, be but a Conceit. And this same *Observation* also may bee drawne to the present purpose of Nourishing Emaciated Bodies: And therefore *Gentle Friction* draweth forth the Nourishment, by making the Parts a little hungry, and heating them; wher by they call forth Nourishment the better. This *Friction* I wish to be done in the Morning. It is also best done by the Hand or a peece of *Scarlet* wooll, wet a little with *Oile of Almonds*, mingled with a small Quantity of *Bay-Salt*, or *Saffron*; We see that the very Currying of *Horses* doth make them fat, and in good liking.

The fifth *Meane* is, to further the very *Act*, of *Assimilation* of Nourishment; which is done by some outward *Emollients*, that make the Parts more apt to *Assimilate*. For which I have compounded an Ointment of Excellent Odour, which I call *Roman Ointment*, vide the *Receit*. The use of it would bee betwene Sleepes; For in the latter Sleepe the Parts *Assimilate* chiefly.

There be many *Medicines*, which by themselves would doe no Cure, but perhaps Hurt; but being applyed in a certaine Order, one after another, doe great Cures. I have tried (my selfe) a *Remedy* for the *Gout*, which hath seldome failed, but driven it away in 24. Houres space: It is first to apply a *Pulvisse*; Of which vide the *Receit*; And then a *Bath* or *Fomentation* of which vide the *Receit*; And then a *Plaster*, vide the *Receit*. The *Pulvisse* relaxeth the Pores, and maketh the Humour apt to *Exhale*. The *Fomentation* calleth forth the Humour by Vapours; But yet in regard of the way made by the *Pulvisse*, Draweth gently; And therefore draweth the Humours out; and doth not draw more to it; For it

Experiment
Solitary touching
Filius
Medicinalis.

60

is a *Gentle Fomentation*, and hath withall a Mixture, (though very little) of some *Stupefactive*. The *Plaster* is a Moderate *Astringent Plaster*, which repelleth New Humour from falling. The *Pultasse* alone would make the Part more soft, and weake; And apter to take the Defluxion and Impression of the Humour. The *Fomentation* alone, if it were too weake, without way made by the *Pultasse*, would draw forth little; If too strong, it would draw to the Part, as well as draw from it. The *Plaster* alone, would pen the Humour already contained in the Part, and so exasperate it, as well as forbid new Humour. Therefore they must be all taken in Order, as is said. The *Pultasse* is to bee laid to, for two or three Houres: The *Fomentation* for a Quarter of an Houre, or somewhat better, being used hot, and seven or eight times repeated: The *Plaster* to continue on still, till the Part be well confirmed.

Experiment
Solitary tou-
ching Cure by
Custome.

61

There is a secret Way of Cure, (unpractized;) By *Assuetude* of that which in it selfe hurteth. *Poysons* have been made, by some, Familiar, as hath beene said. *Ordinary keepers* of the *Sicke* of the *Plague*, are sel, dome infected. *Enduring of Torturs*, by *Custome*, hath beene made more easie: The *Breaking* of Enormous *Quantity of Meats*, and so of *wine* or *Strong Drinke*, hath beene, by *Custome*, made to bee without *Surfet*, or *Drunkennesse*. And generally *Diseases* that are *Chronicall*, as *Coughes*, *Phthisickes*, some kindes of *Palsyes*, *Lunacies*, &c. are most dangerous at the first: Therefore a wise *Physitian* will consider whether a *Disease* be Incurable; Or whether the Just Cure of it bee not full of perill; And if hee finde it to bee such, let him resort to *Palliation*; And alleviate the *Symptome*, without busying himselfe to much with the perfect Cure: And many times, (if the *Patient* bee indeed patient,) that Course will exceed all Expectation. Likewise the *Patient* himselfe may strive, by little and little, to Overcome the *Symptome*, in the Exacerbation, and so, by time, turne Suffering into Nature.

Experiment
Solitary tou-
ching Cure by
Excesse.

62

Divers *Diseases*, especially *Chronicall*, (such as *Quartian Agues*;) are sometimes cured by *Surfet*, and *Excesses*: As *Excesse of Meat*, *Excesse of Drinke*, *Extraordinary Fasting*, *Extraordinary Stirring*, or *Lassitude*, and the like. The Cause is, for that *Diseases of Continuance* get an Adventitious Strength from *Custome*, besides their *Materiall Cause* from the *Humours*: So that the *Breaking* of the *Custome* doth leaue them only to their first Cause; which if it be any thing weake will fall off. Besides, such *Excesses* doe Excite and Spur *Nature*, which thereupon riseth more forcibly against the *Disease*.

Experiment
Solitary tou-
ching Cure by
Motion of Con-
sent.

63

There is in the Body of Man a great Consent in the Motion of the severall Parts. We see, it is Childrens sport, to prove whether they can rub upon their Brist with one hand, and pat upon their Fore-head with another; And straight waies, they shall sometimes rubbe with both Hands, or pat with both hands. Wee see, that when the Spirits, that come to the Nostrills, expell a bad Sent, the Stomach is ready to Ex-
pell

pellby Vomit. We finde that in *Consumptions* of the *Lungs*, when Nature cannot expell by *Cough*, Men fall into *Fluxes* of the *Belly*, and then they dye. So in *Pestilent Diseases*, if they cannot bee expelled by *Sweat* they fall likewise into *Loosnesse*, and that is commonly Mortall. Therefore *Physitians* should ingeniously contrive, how by *Motions* that are in their *Power*, they may excite *Inward Motions* that are not in their *Power*, by *Consent*: As by the *Stench* of *Feathers*, or the like, they cure the *Rising* of the *Mother*.

Hippocrates *Aphorisme*, In *Morbis minus*, is a good profound *Aplorisme*. It importeth, that *Diseases*, contrary to the *Complexion*, *Age*, *Sexe*, *Season of the yeare*, *Diet*, &c. are more dangerous, than those that are *Concurrent*. A Man would thinke it should be otherwise; For that, when the *Accident of Sicknesse*, and the *Naturall Disposition*, doe second the one the other, the *Disease* should bee more forcible: And so (no doubt) it is; if you suppose like *Quantitie of Matter*. But that, which maketh good the *Aphorisme*, is, Because such *Diseases* doe shew a greater *Collection of Matter*, by that they are able to overcome those *Naturall Inclinations* to the *Contrary*. And therefore in *Diseases* of that kinde, let the *Physition* apply himselfe more to *Purgation*, than to *Alteration*; Because the *Offence* is in the *Quantity*; and the *Qualities* are rectified of themselves.

Phytians do wisely prescribe, that there be *Preparatives* used before *Iust Purgations*; For certaine it is, that *Purgers* doe many times great Hurt, if the Body bee not accommodated, both before, and after the *Purgings*. The Hurt that they doe, for want of *Preparation* before *Purgings*, is by the Sticking of the *Humours*, and their not comming faire away; Which causeth in the Body great *Perturbations*, and ill *Accidents*, during the *Purgings*; And also, the diminishing, and dulling of the Working of the *Medicine* it selfe, that it purgeth not sufficiently, Therefore the worke of *Preparation* is double; To make the *Humours* *fluide*, and mature; And to make the *Passages* more open: For both those helpe to make the *Humours* passe readily. And for the former of these, *Sirrup*s are most profitable; And for the Latter, *Apozumes*, or *Preparing Broths*; *Clisters* also helpe lest the *Medicine* stop in the *Guts*, and worke gripingly. But it is true, that *Bodies abounding with Humours*; And *fat Bodies*; And *Open Weather*; are *Preparatives* in themselves; because they make the *Humours* more fluide. But let a *Physitian* beware, how he purge after hard *Frosty Weather*, and in a *Leane Body*, without *Preparation*. For the Hurt, that they may doe after *Purgings*; It is caused by the *Lodging* of some *Humours* in ill *Places*: For it is certaine, that there be *Humours*, which somewhere placed in the Body, are quiet, and doe little hurt; In other *Places*, (especially *Passages*,) doe much mischief. Therefore it is good, after *Purgings*, to use *Apozumes*, and *Broths*, not so much *Opening* as those used before *Purgings*, but *Abstersive* and *Mundifying*.

Experiment
Solitary touching
Cure of
Diseases which
are contrary to
Predisposition.

64

Experiment
Solitary touching
Preparations before
Purgings, and
settling of the
Body afterward.

65

Mundifying Clusters also are good to conclude with, to draw away the Reliques of the Humors, that may have descended to the *Lower Region* of the *Body*.

Experiment
Solitary touch-
ing Stanch-
ing of Bloud.

66

Blood is stanch'd divers wayes. First by *Astringents*, and *Repercussive Medicines*. Secondly by *Drawing* of the *Spirits* and *Bloud inwards*; which is done by *Cold*; As *Iron* or a *Stone* laid to the neck doth stanch the Bleeding at the Nose; Also it hath beene tryed, that the *Testicles*, being put into sharp *Vineger*, hath made a suddaine *Recess* of the *Spirits*, and stanch'd *Bloud*. Thirdly by the *Recess* of the *Bloud* by *Sympathy*. So it hath beene tried, that the part that bleedeth, being thrust into the *Body* of a *Capon*, or *Sheepe*, new ript and bleeding, hath stanch'd *Bloud*; The *Bloud*, as it seemeth, sucking and drawing up, by similitude of substance, the *Bloud* it meeteth with, and so it selfe going backe. Fourthly by *Custom* and *Time*; So the *Prince of Au- range*, in his first hurt, by the *Spanish Boy*, could finde no meanes to stanch the *Bloud*, either by *Medicine* or *Ligament*; but was faine to have the *Orifice* of the wound stopped by *Mens Thumbes*, succeeding one another, for the space at the least of two *Dayes*; And at the last the blood by *Custom* onely retired. There is a fifth *Way* also in use, to let *Bloud* in an *Adverse Part*, for a *Revulsion*.

Experiment
Solitary touch-
ing Change of
Aliments and
Medicines.

67

IT helpeth, both in *Medicine*, and *Aliment*, to Change and not to continue the same *Medicine* & *Aliment* still. The Cause is, for that *Nature* by continuall Use of any Thing, groweth to a *Sacietie*, and *Dulnesse*, either of *Appetite*, or *working*. And we see that *Assuetude* of *Things Hurtfull* doth make them leese their force to Hurt; As *Poyson*, which with use some have brought themselves to brooke. And therefore it is no marvaile, though *Things helpfull* by *Custom*, leese their force to Helpe, I count *Intermission* almost the same thing with *Change*; For that, that hath beene intermitted, is after a sort new.

Experiment
Solitary touch-
ing *Diets*.

68

IT is found by Experience, that in *Diets* of *Guaiacum*, *Sarza*, and the like (especially if they be strict,) the *Patient* is more troubled in the beginning, than after continuance; Which hath made some of the more delicate Sort of patients, give them over in the midst; Supposing that if those *Diets* trouble them so much at first, they shall not be able to endure them to the End. But the Cause is, for that all those *Diets*, doe drie up *Humours*, *Rheumes*, and the like; And they cannot Drie up untill they have first attenuated; And while the *Humour* is attenuated, it is more Fluid, then it was before, and troubleth the *Body* a great deale more, untill it be dried up, and consumed. And therefore *Patients* must expect a due time, and not check at them at the first.

Experiments
in Confort
touching the
Production of
Cold.

THe Producing of *Cold* is a thing very worthy the Inquisition; both for Use, & Disclosure of Causes. For *Heat* and *Cold*

Cold are *Natures* two hands, whereby shee chiefly worketh: And *Heat* we have in readinesse, in respect of the *Fire*; But for *Cold* wee must staie till it commeth; or seeke it in deepe Caves, or high Mountaines: And when all is done, we cannot obtaine it in any great degree: For *Furnaces* of *Fire* are farr hotter, than a *Summers Sunne*; But *Vaults*, or *Hills* are not much Colder than a *Winters Frost*.

The first *Meanes* of *Producing Cold*, is that which *Nature* presenteth us withall; Namely the *Expiring* of *cold* out of the *Inward Parts* of the *Earth* in *Winter*, when the *Sun* hath no power to overcome it; the *Earth* being (as hath beene noted by some) *Primum Frigidum*. This hath beene asserted, as well by *Ancient* as by *Moderne Philosophers*: It was the Tenet of *Parmenides*. It was the opinion of the *Author* of the discourse in *Plutarch* (for I take it that booke was not *Plutarches* owne) *De primo Frigido*. It was the opinion of *Teleseus*, who hath renewed the *Philosophy* of *Parmenides*, and is the best of the *Novellists*.

The second *Cause* of *Cold* is the *Contact* of *Cold Bodies*; For *Cold* is *Active* and *Transitive* into *Bodies Adjacent*, as well as *Heat*: which is seene in those things that are touched with *Snow* or *Cold water*. And therefore, whosoever will be an *Inquirer* into *Nature*, let him resort to a *Conservatory* of *Snow* and *Ice*; Such as they use for delicacy, to coole *Wine* in *Summer*: Which is a *Poore* and *Contemptible* use, in respect of other uses, that may bee made of such *Conservatories*.

The Third *Cause* is the *Primary Nature* of all *Tangible bodies*: For it is well to be noted, that all Things whatsoever (*Tangible*) are of themselves *Cold*; Except they have an *Accessory Heat* by *fire*; *Life*; or *Motion*: For even the *Spirit* of *Wine*, or *Chymicall Oyles*, which are so hot in *Operation*, are to the first Touch, *Cold*; And *Aire* it selfe compressed, & *Condensed* a little by blowing, is *Cold*.

The Fourth *Cause* is the *Density* of the *Body*: For all *Dense Bodies* are *Colder* than most other *Bodies*, As *Metals*, *Stone*, *Glasse*; And they are longer in *Heating* than *Softer Bodies*. And it is certaine, that *Earth*, *Dense*, *Tangible*, hold all of the *Nature* of *Cold*. The *Cause* is, for that all *Matters Tangible* being *Cold* it must needs follow, that where the *Matter* is most *Congregate*, the *Cold* is the greater.

The Fifth *Cause* of *Cold*, or rather of increase and vehemence of *Cold*, is a *Quicke Spirit* inclosed in a *Cold Body*: As will appeare to any that shall attentively consider of *Nature* in many Instances. Wee see *Nieve* (which hath a *Quicke Spirit*) is *Cold*; more *Cold* to the *Tongue*, than a *Stone*; So *Water* is *Colder* than *Oile*, because it hath a *Quicker Spirit*; For all *Oile*, though it hath the *Tangible Parts* better digested than *water*, yet hath it a duller *Spirit*: So *Snow* is *Colder* than *water*, because it hath more *Spirit* within it: So we see that *Salt* put to *Ice* (as in the producing of the *Artificiall Ice*) increaseth the *Activity* of *Cold*: So some *Insecta* which have

Spirit

Spirit of Life, as *Snakes*, and *Silkwormes*, are to the touch, *Cold*. So *Quick-silver* is the *Coldest* of *Mettales*, because it is *fullest* of *Spirit*.

74

The *Sixth Cause* of *Cold* is the *Chasing and Driving away* of *Spirits*, such as have some *Degree of Heat*: For the *Banishing* of the *Heat* must needs leave any *Body Cold*. This wee see in the *Operation* of *Opium*, and *Stupefactive*s, upon the *Spirits* of living *Creatures*: And it were not amisse to trie *Opium*, by laying it upon the *Top* of a *weather-glasse*, to see whether it will contract the *Aire*: But I doubt it will not succeed: For besides that the vertue of *Opium* will hardly penetrate thorow such a *Body* as *Glasse*, I conceive that *Opium*, and the like, make the *Spirits* fly rather by *Maglignity*, than by *Cold*.

75

Seventhly, the same *Effect* must follow upon the *Exhaling or Drawing out* of the *warme Spirits*, that doth upon the *Flight* of the *Spirits*. There is an *Opinion*, that the *Moone* is *Magneticall* of *Heat*, as the *Sun* is of *Cold* and *Moisture*: It were not amisse therefore to trie it, with *warme-waters*; The one exposed to the *Beames* of the *Moone*; the other with some *Skreene* betwixt the *Beames* of the *Moone* and the *water*; As we use to the *Sunne* for *Shade*; And to see whether the former will coole sooner. And it were also good to inquire, what other *Meanes* there may be, to draw forth the *Exile heat*, which is in the *Aire*; for that may bee a *Secret* of great *Power* to *Produce Cold weather*.

Experiments
in Consort
touching the
Version and
Transmutation
of Aire into wa-
ter.

WEE have formerly set downe the *Meanes* of turning *Aire* into *water*, in the *Experiment* 27. But because it is *Magnale Naturæ*; And tendeth to the subduing of a very great effect; And is also of *Manifold use*; we will adde some *Instances* in *Consort* that give light thereunto.

76

It is reported by some of the *Ancients*, that *Sailers* have used, every *Night*, to hang *Fleeces of wooll* on the *sides* of their *Ships*, the *wooll* towards the *water*; And that they have crushed fresh *Water* out of them, in the *Morning*, for their use. And thus much wee have tried, that a *Quantitie* of *wooll* tied loose together being let downe into a deepe *well*; And hanging in the *Middle*, some three *Fathome* from the *water*, for a *night*, in the *Winter* time; increased in weight, (as I now remember) to a fifth *Part*.

77

It is reported by one of the *Ancients*, that in *Lydia*, neare *Pergamus*, there were certaine *worke-men*, in time of *warres* fled into *Caves*; And the *Mouth* of the *Caves* being stopped by the *Enemies*, they were famished. But long time after the dead *Bones* were found; And some *Vessels* which they had carried with them; And the vessels full of *water*; And that *Water*, thicker, and more towards *Ice*, than *Common water*: which is a *Notable Instance* of *Condensation*, and *Induration* by *Burial* under *Earth*, (in *Caves*,) for long time; And of *version* also (as it should seeme,) of *Aire* into *Water*; if any of those vessels were *Emptie*. Trie therefore a small *Bladder* hung in *Snow*; And the like in *Nitre*; And the like

like in *Quick-silver*: And if you find the *Bladders* fallen, or shrunke; you may bee sure the *Aire* is condensed by the *Cold* of those *Bodies*; As it would bee in a *Cave* under *Earth*.

It is reported of very good credit, that in the *East-Indies*, if you set a Tub of *water* open in a Roome where *Cloves* are kept, it will be drawne dry in 24. houres; Though it stand at some distance from the *Cloves*. In the Countrey, they use many times, in deceit, when their *wooll* is new shorne, to set some *Pailles* of *water* by, in the same Roome; to increase the weight of the *wooll*. But it may bee, that the Heat of the *wooll*, remaining from the body of the *Sheepe*; or the Heat gathered by the lying close of the *wooll*, helpeth to draw the watry Vapour; But that is nothing to the *Versjon*.

It is Reported also credibly, that *wooll* new shorne, being laid casually upon a *Vessell* of *Verjuyce*, after some time, had drunke up a great part of the *Verjuyce*, though the *Vessell* were whole without any *Flaw*, and had not the Bung-hole open. In this *Instance*, there is (upon the by) to be noted, the *Percolation*, or *Swing* of the *Verjuyce* through the wood; For *Verjuyce* of it selfe would never have passed thorow the wood: So as, it seemeth, it must bee first in a kinde of Vapour, before it passe.

It is especially to bee noted, that the Cause, that doth facilitate the *Versjon* of *Aire* into *water*, when the *Aire* is not in grosse, but subtilly mingled with *Tangible Bodies*, is, (as hath beene partly touched before,) for that *Tangible Bodies* have an Antipathy with *Aire*; And if they finde any *Liquid Body*, that is more dense, neare them, they will draw it: And after they have drawne it, they will condense it more, and in effect incorporate it; For we see that a *Sponge*, or *wooll*, or *Sugar*, or a *woollen cloth*, being put but in part, in *water*, or *wine*, will draw the *Liquour* higher, and beyond the place: where the *water* or *wine* commeth. We see also, that *wood*, *Lute-strings*, and the like, doe swell in moist Seasons: As appeareth by the *Breaking* of the *Strings*, the *Hard Turning* of the *Pegs*, and the *Hard drawing forth* of *Boxes*, and *Opening* of *Wainscot doores*; which is a kind of *Infusion*: And is much like to an *Infusion* in *water*, which will make *wood* to swell: As wee see in the *Filling* of the *Chops* of *Boules*, by laying them in *water*. But for that part of these *Experiments*, which concerneth *Attraction*, we will reserve it to the proper *Title* of *Attraction*.

There is also a *Versjon* of *Aire* into *water*, scene in the *Sweating* of *Marbles*, and other *Stones*. And of *Wainscot* before and in moist weather: This must be, either by some *Moisture* the *Body* yeeldeth; Or else by the Moist *Aire* thickned against the hard body. But it is plaine, that it is the latter; For that wee see *wood painted with Oyle Colour*, will sooner gather drops in a moist Night, than *wood* alone: which is caused by the Smoothnesse and Closenesse; which letteth in no part of the Vapour, and so turneth it backe, and thickeneth it into Dew. We see also, that *Breathing* upon a *Glasse*, or *Smooth body*, giveth a Dew; And in *Frosty Mornings* (such as we call *Rime frosts*) you shall finde drops of Dew upon the

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Spirit of Life, as *Snakes*, and *Silkwormes*, are to the touch, *Cold*. So *Quick-silver* is the *Coldest* of *Mettales*, because it is *fullest* of *Spirit*.

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The *Sixth Cause* of *Cold* is the *Chasing and Driving away* of *Spirits*, such as have some *Degree of Heat*: For the *Banishing* of the *Heat* must needs leave any *Body Cold*. This wee see in the *Operation* of *Opium*, and *Stupratives*, upon the *Spirits* of living *Creatures*: And it were not amisse to trie *Opium*, by laying it upon the *Top* of a *weather-glasse*, to see whether it will contract the *Aire*: But I doubt it will not succeed: For besides that the vertue of *Opium* will hardly penetrate thorow such a *Body* as *Glasse*, I conceive that *Opium*, and the like, make the *Spirits* fly rather by *Maglignity*, than by *Cold*.

75

Seventhly, the same *Effect* must follow upon the *Exhaling or Drawing out* of the *warne Spirits*, that doth upon the *Flight* of the *Spirits*. There is an *Opinion*, that the *Moone* is *Magneticall* of *Heat*, as the *Sun* is of *Cold* and *Moisture*: It were not amisse therefore to trie it, with *warne-waters*; The one exposed to the *Beames* of the *Moone*; the other with some *Skreene* betwixt the *Beames* of the *Moone* and the *water*; As we use to the *Sunne* for *Shade*; And to see whether the former will coole sooner. And it were also good to inquire, what other *Meanes* there may be, to draw forth the *Exile heat*, which is in the *Aire*; for that may bee a *Secret* of great *Power* to *Produce Cold weather*.

Experiments
in Confort
touching the
Version and
Transmutation
of Aire into wa-
ter.

WE have formerly set downe the *Meanes* of turning *Aire* into *water*, in the *Experiment 27*. But because it is *Magnale Naturæ*; And tendeth to the subduing of a very great effect; And is also of *Manifold use*; we will adde some *Instances* in *Confort* that give light thereunto.

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It is reported by some of the *Ancients*, that *Sailers* have used, every *Night*, to hang *Fleeces of wooll* on the *sides* of their *Ships*, the *wooll* towards the *water*; And that they have crushed fresh *Water* out of them, in the *Morning*, for their use. And thus much wee have tried, that a *Quantitie* of *wooll* tied loose together being let downe into a deepe *well*; And hanging in the *Middle*, some three *Fathome* from the *water*, for a *night*, in the *Winter time*; increased in weight, (as I now remember) to a *fifth Part*.

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It is reported by one of the *Ancients*, that in *Lydia*, neare *Pergamum*, there were certaine *worke-men*, in time of *warres* fled into *Caves*; And the *Mouth* of the *Caves* being stopped by the *Enemies*, they were famished. But long time after the dead *Bones* were found; And some *Vessels* which they had carried with them; And the vessels full of *water*; And that *Water*, thicker, and more towards *Ice*, than *Common water*: which is a *Notable Instance* of *Condensation*, and *Induration* by *Buriall* under *Earth*, (in *Caves*,) for long time; And of *version* also (as it should seeme,) of *Aire* into *Water*; if any of those vessels were *Emptie*. Trie therefore a small *Bladder* hung in *Snow*; And the like in *Nitre*; And the like

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the Inside of Glasse-windowes; And the *Frost* it selfe upon the ground is but a *Version* or *Condensation*, of the Moist vapours of the Night, into a watry substance: *Dewes* likewise, and *Raine*, are but the Returnes of Moist vapours Condensed; The Dew, by the *Cold* onely of the Sunnes departure, which is the gentler *Cold*; *Raines*, by the *Cold* of that, which they call the *Middle Region* of the *Aire*; which is the more violent *Cold*.

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It is very probable (as hath beene touched) that that, which will turne *water* into *Ice*, will likewise turne *Aire* Some Degree nearer unto *water*. Therefore trie the *Experiment* of the *Artificiall Turning water into Ice* (whereof we shall speake in another place) with *Aire* in place of *water*, and the *Ice* about it. And although it bee a greater Alteration to turne *Aire* into *water*, than *water* into *Ice*: yet there is this Hope, that by Continuing the *Aire* longer time, the effect will follow; For that *Artificiall Conversion* of *water* into *Ice*, is the worke of a few Houres; And this of *Aire* may be tried by a Moneths space, or the like.

Experiments
in Consort
touching Indu-
ration of Bodies.

Induration, or *Lapidification*, of Substances more soft, is likewise another degree of *Condensation*; And is a great *Alteration* in Nature. The Effecting and Alccelerating thereof is very worthy to bee inquired. It is effected by three Meanes. The first is by *Cold*; whose Property is to *Condense*, and constipate, as hath beene said. The Second is by *Heat*; which is not proper but by consequence; For the *Heat* doth attenuate; And by Attenuation doth send forth the Spirit and moister Part of a Body; And upon that, the more grosse of the Tangible Parts doe contract and ferre themselves together; Both to Avoid *Vacuum* (as they call it;) And also to Munit themselves against the Force of the *Fire*, which they have suffered. And the Third is by *Assimilation*; when a Hard Body Assimilateth a Soft, being contiguous to it.

The Examples of *Induration*, taking them promiscuously, are many: As the Generation of *Stones* within the Earth, which at the first are but *Rude Earth*, or *Clay*: And so of *Mineralls*, which come (no doubt) at first, of Juyces Concrete, which afterward indurate: And so of *Porcellane*, which is an *Artificiall Cement*, buried in the Earth a long time: And so the Making of *Bricke*, and *Tile*: Also the Making of *Glasse*, of a certaine Sand, and Brake-Roots, and some other Matters: Also the *Exudations* of *Rock-Diamonds*, & *Coystall*, which harden

den with time : Also the *Induration* of *Bead-Amber*, which at first is a soft Substance; As appeareth by the *Flies*, & *Spiders*, which are found in it ; And many more : But we will speake of them distinctly.

For *Indurations* by *Cold*, there bee few *Trialls* of it ; For wee have no strong or intense *Cold* here on the Surface of the *Earth*, so neare the Beames of the *Sunne*, and the *Heavens*. The likeliest *Triall* is by *Snow*, and *Ice* ; For as *Snow* and *Ice*, especially being holpen, and their *Cold* activated by *Nitre*, or *Salt*, will turne *water* into *Ice*, and that in a few houres; So it may be, it will turne *wood*, or *Stiffe Clay*, into *Stone*, in longer time. Put therefore, into a *Conserving Pit* of *Snow*, and *Ice*, (adding some quantity of *Salt*, and *Niter*,) a Peece of *wood*, or a Peece of *Tough Clay*, and let it lye a Moneth, or more.

Another *Triall* is by *Metalline-waters*, which have virtuall *Cold* in them. Put therefore *wood*, or *Clay*, into *Smiths water*, or other *Metalline water* ; And try whether it will not harden in some reasonable time. But I understand it, of *Metalline waters*, that come by *Washing*, or *Quenching* ; And not of *Strong waters* that come by dissolution ; for they are too *Corrosive* to consolidate.

It is already found, that there are some *Naturall Spring-waters*, that will *Inlapidate wood* ; So as you shall see one peece of *wood*, whereof the Part above the *water* shall continue *wood* ; And the Part under the *water* shall be turned into a kinde of *Gravelly Stone*. It is likely those *waters* are of some *Metalline Mixture* ; But there would be more particular Inquiry made of them. It is certaine, that an *Egge* was found, having li- en many yeeres in the bottome of a *Moate*, where the *Earth* had some- what overgrown it ; And this *Egge* was comen to the *Hardnesse* of a *Stone* ; And had the Colours of the white and yolke perfect : And the *Shell* shining in small graines like *Sugar*, or *Alabaster*.

Another Experience there is of *Induration* by *Cold*, which is already found; which is, that *Metalls*, themselves are hardened by often *Heating* and *quenching* in *Cold water* : For *Cold* ever worketh most po- tently upon *Heat* precedent.

For *Induration* by *Heat*, it must be considered, that *Heat*, by the Ex- haling of the *Moister Parts*, doth either harden the *Body* ; As in *Bricks*, *Tiles*, &c; Or if the *Heat* be more firce, maketh the grosser part it selfe, Runne and Melt ; As in the making of ordinary *Glasse* ; And in the *Vitri- fication* of *Earth*, (As we see in the Inner Parts of *Furnaces* ;) And in the *Vitrification* of *Brick* ; And of *Metalls*. And in the former of these, which is the *Hardening* by baking, without Melting, the *Heat* hath these de- grees ; First it *Indurateth* ; and then maketh *Fragile* ; And lastly it doth *Incinerate* and *Calciate*.

But if you desire to make an *Induration* with *Toughnesse*, and lesse *Fragility* ; A middle way would be taken ; Which is that which *Aristotle* hath wel noted, But would be thoroughly verified. It is, to decoct *Bodies* in *water*,

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water, for two or three dayes; But they must bee such Bodies, into which the *water* will not enter; As *Stone*, and *Metall*. For if they be Bodies into which the *water* will enter, then long Seething, will rather Soften than indurate them; As hath been tried in *Eggs* &c. Therefore, Softer Bodies must bee put into Bottles; And the Bottles hung into *Water* seething, with the mouths open, above the *water*; that no *water* may get in; For by this Meanes, the virtuall *Heat* of the *water* will enter; And such a *Heat*, as will not make the Body adust, or fragile; But the Substance of the *water* will bee shut out. This Experiment wee made; And it sorted thus. It was tried with a peece of *Free-Stone*, and with *Pewter*, put into the *Water* at large. The *Free-Stone* we found received in some *water*; For it was softer, and easier to scrape, than a peece of the same *Stone* kept drie. But the *Pewter* into which no *water* could enter, became more white, and liker to *Silver*, and lesse flexible, by much. There were also put into an Earthen Bottle, placed as before, a good Pellet of *Clay*, a Peece of *Cheese*, a Peece of *Chalke*, & a Peece of *Free-stone*. The *Clay* came forth almost of the Hardnesse of *Stone*; The *Cheese* likewise very hard, and not well to be cut: The *Chalke* and the *Free-Stone* much harder than they were. The colour of the *Clay* inclined not a whit to the Colour of *Bricke*, but rather to white, as in ordinary Drying by the Sunne. Note, that all the former Trials were made by a Boyling upon a good hot Fire, renewing the *water* as it consumed, with other hot *water*; But the Boyling was but for twelve houres only; And it is like that the Experiment would have beene more effectuell, if the Boyling had beene for two or three daies, as we prescribed before.

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As touching *Assimilation*, (for there is a degree of *Assimilation* even in Inanimate bodies) wee see Examples of it in some *Stones* in *Clay-Grounds*, lying near to the top of the Earth, where *Pebble* is; In which you may manifestly see divers *Pebbles* gathered together, and a Crust of *Cement* or *Stone* betweene them, as hard as the *Pebbles* themselves: And it were good to make a Trial of purpose, by taking *Clay*, and putting in it divers *Pebble-Stones*, thicke set, to see whether in continuance of time, it will not be harder than other *Clay* of the same lumpe, in which no *Pebbles* are set. Wee see also in Ruines of old Walls, especially towards the Bottom, the *Mortar* will become as hard as the *Bricke*; we see also, that the wood on the sides of *Vessels* of *Wine*, gathereth a Crust of *Tartar*, harder than the wood it selfe; And Scales likewise grow to the *Teeth*, harder than the *Teeth* themselves.

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Most of all, *Induration* by *Assimilation* appeareth in the Bodies of *Trees*, and *living Creatures*: For no Nourishment that the *Tree* receiveth, or that the *living Creature* receiveth, is so hard as *Wood*, *Bone*, or *Horne*, &c. but is *Indurated* after by *Assimilation*.

Experiment
Solitary touching the
Perfection of *Water*
into *Aire*.

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THE Eye of the understanding, is like the Eye of the Sense: For as you may see great Objects through smal Cránies, or Levels: So you may

may see great *Axiomes* of *Nature*, through small and *Contemptible Instances*. The *Speedy Depredation* of *Aire* upon *watry Moisture*, and *Version* of the same into *Aire*, appeareth in nothing more visible, than in the sudden Discharge, or vanishing, of a little *Cloud* of *Breach*, or *Vapour*, from *Glasse*, or the *Blade* of a *Sword*, or any such Polished Body; Such as doth not at all Detaine, or Imbibe the Moisture; For the Mistinesse scattereth and breaketh up suddenly. But the like *Cloud*, if it were *Oyle*, or *Fatty*, will not discharge; Not because it sticketh faster; But because *Aire* preyeth upon *Water*; And *Flame*, and *Fire*, upon *Oyle*; And therefore, to take out a Spot of Grease, they use a *Coale* upon browne Paper; because *Fire* worketh upon Grease, or *Oyle*, as *Aire* doth upon *Water*. And we see *Paper oyled*, or *Wood oyled*, or the like, last long moist; but *Wet* with *Water*, drie, or putrifie sooner. The Cause is, for that *Aire* meddeth little with the *Moisture* of *Oyle*.

There is an Admirable demonstration, in the same trifling *Instance* of the little *Cloud* upon *Glasse*, or *Gemmes*, or *Blades* of *Swords*, of the *Force of Union*, even in the least Quantities, and weakest Bodies, how much it conduceth to Preservation of the present Forme; And the Resisting of a New. For marke well the discharge of that *Cloud*; And you shall see it ever breake up, first in the Skirts, and last in the middest. We see likewise, that much *Water* draweth forth the Juyce of the Body Infused; But little water, is imbibed by the Body: And this is a Principall Cause, why in Operation upon *Bodies*, for their *Version* or *Alteration*, the Triall in great Quantities, doth not answer the Triall in small; And so deceiveth many; For that (I say) the greater Body, resisteth more any Alteration of Forme, and requireth farre greater Strength in the Active Body, that should subdue it.

We have spoken before, in the fifth *Instance*, of the Cause of *Orient Colours*, in *Birds*; which is by the Finenesse of the Strainer; we will now endeavour to reduce the same *Axiome* to a *Work*. For this Writing of our *Sylva Sylvarum*, is (to speake properly) not *Naturall History*, but a high kinde of *Naturall Magicke*. For it is not a Description onely of Nature, but a Breaking of Nature, into great and strange Workes. THe therefore, the Anointing over of *Pigeons*, or other *Birds*, when they are but in their downe; Or of *Whelps*, cutting their Haire as short as may be; Or of some other Beast; with some oyntment, that is not hurtfull to the Flesh; And that will harden, and sticke very close; And see whether it will not alter the Colours of the *Feathers*, or *Haire*. It is received, that the *Pulling* off, the first *Feathers* of *Birds*, cleane, will make the new come forth *white*: And it is certaine, that *White* is a penurious Colour, and where Moisture is scant. So *Blen Violets*, and other *Flowers*; if they be starved, turne Pale and *white*; *Birds*, and *Horses*, by Age, or Scarres, turne *white*: And the *Hoare Haires* of Men, come by the same reason. And therefore in *Birds*, it is very likely, that the *Feathers* that

Experiment
Solitary tou-
ching the Force
of Union.

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Experiment
Solitary tou-
ching the Pro-
ducing of Fea-
thers and
Haires of di-
vers Colours.

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come first, will be many times of divers Colours, according to the Nature of the *Bird*; For that the Skin is more porous; But when the Skin is more shut, and close, the Feathers will come *white*. This is a good *Experiment*, not onely for the Producing of *Birds* and *Beasts* of strange Colours; but also, for the Disclosure of the Nature of Colours themselves; which of them require a finer Porositie, and which a grosser.

Experiment
Solitary touch-
ing the Nour-
ishment of Li-
ving Creatures
before they bee
brought forth.

94

IT is a worke of Providence, that hath beene truly observed by some; That the *rolke* of the *Egge*, conduceth little to the *Generation* of the *Bird*; But onely to the *Nourishment* of the same: For if a *Chicken* be opened, when it is new hatched; you shall finde much of the *rolke* remaining. And it is needfull, that *Birds*, that are shaped without the Females Wombe; have in the *Egge*, as well Matter of Nourishment, as Matter of generation for the Body. For after the *Egge* is laid, and severed from the Body of the *Hen*; It hath no more Nourishment from the *Hen*; But onely a quickening *Heat* when shee sitteth. But *Beasts*, and *Men* need not the matter of Nourishment within themselves; Because they are shaped within the Wombe of the Female, and are Nourished continually from her Body.

Experiments
in Consort
touching Sym-
pathy and Anti-
pathy for Medi-
cinall use.

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IT is an Inveterate and received Opinion, that *Cantharides* applyed to any Part of the Body, touch the *Bladder*, and exulcerate it, if they stay on long. It is likewise Received, that a kinde of *Stone*, which they bring out of the *West Indies*, hath a peculiar force to move *Gravell*, and to dissolve the *Stone*; In so much, as laid but to the wrest, it hath so forcibly sent downe *Gravell*, as *Men* have beene glad to remove it; It was so violent.

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It is received and confirmed by daily Experience, that the *Soales* of the *Feet* have great Affinitie with the *Head*, and the *Mouth* of the *Stomach*: As we see, *Going wet-shod*, to those that use it not, affecteth both: Applications of *hot Powders* to the *Feet* attenuate first, and after drie the *Rheume*: And therefore a *Physitian*, that would be Mystically, prescribeth, for the Cure of the *Rheume*, that a *Man* should walke Continually upon a *Camomill Alley*; Meaning, that he should put *Camomill* within his *Sockes*. Likewise *Pigeons bleeding*, applyed to the *Soales* of the *Feet*, ease the *Head*: And *Soporiferous Medicines* applyed unto them, provoke *sleepe*.

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It seemeth, that as the *Feet* have a Sympathy with the *Head*; So the *wrests* and *Hands*, have a Sympathy with the *Heart*; We see the Affects and Passions of the *Heart*, and *Spirits*, are notably disclosed by the *Pulse*: And it is often tried, that Juyces of *Stock-Gilly-Flowers*, *Rose-Campian*, *Carlicks*, and other things; applyed to the *wrests*, and renewed; have cured long *Agues*. And I conceive, that washing with certaine *Liquours*, the *Palms* of the *Hands*, doth much good: And they doe well in *Heats* of *Agues*, to hold in the *Hands*, *Egges* of *Alabaster*, and *Balls* of *Crysell*.

Of these things wee shall speake more, when wee handle the Title of Sympathy and Antipathy, in the proper Place.

The

THe Knowledge of man (hitherto) hath beene determined by the View, or Sight; So that whatsoever is Invisible, either in respect of the *Finenesse of the Body* it selfe; Or the *Smallnesse of the Parts*; Or of the *Subtiltie of the Motion*; is little inquired. And yet these be the Things that Govern Nature principally; And without which, you cannot make any true *Analysis* and Indication of the Proceedings of Nature. The *Spirits* or *Pneumatics*, that are in all *Tangible Bodies*, are scarce knowne. Sometimes they take them for *Vacuum*; whereas they are the most Active of Bodies. Sometimes they take them for *Aire*; From which they differ exceedingly, as much as Wine from Water; And as Wood from Earth. Sometimes they will have them to be *Naturall Heat*, or a *Portion of the Element of Fire*; Whereas some of them are crude, and cold. And sometimes they will have them to be the *Verities* and *Qualities* of the *Tangible Parts*, which they see; whereas they are Things by themselves. And then, when they come to Plants and living Creatures, they call them *Soules*. And such Superficiall Speculations they have; Like *Prospectives*, that shew things inward, when they are but *Paintings*. Neither is this a Question of Words, but infinitely materiall in *Nature*. For *Spirits* are nothing else but a *Naturall Body*, rarified to a Proportion, and included in the *Tangible Parts* of *Bodies*, as in an Integument. And they be no lesse differing one from the other, than the *Dense* or *Tangible Parts*: And they are in all *Tangible Bodies* whatsoever, more or lesse: And they are never (almost) at rest: And from them, and their *Motions*, principally proceed *Arefaction*, *Colligation*, *Concoction*, *Maturation*, *Putrefaction*, *Vivification*, and most of the Effects of *Nature*: For, as we have figured them in our *Sapientia Veterum*, in the *Fable of Proserpina*, you shall in the Infernall Regiment heare little Doings of *Pluto*, but most of *Proserpina*: For *Tangible Parts* in *Bodies* are Stupide things; And the *Spirits* doe (in effect) all. As for the differences of *Tangible Parts* in *Bodies*, the industry of the *Chymists* hath given some light, in discerning by their Separations, the *Oily*, *Crude*, *Pure*, *Impure*, *Fine*, *grosse Parts* of *Bodies*, and the like. And the *Physicians* are content to acknowledge, that *Herbs* and *Drugs* have divers Parts; As that *Opium* hath a *Stupefactive Part*, and a *Heating Part*; The one moving Sleepe, the other a Sweat following; And that *Rubarb* hath *Purging Parts*, and *Astringent Parts*, &c. But this whole *Inquisition* is weakly and negligently handled. And for the more subtrill differences of the *Minute Parts*, and the Posture of them in the Body, (which also hath great Effects) they are not at all touched: As for the *Motions* of the *Minute Parts* of *Bodies*, which doe so great Effects, they have not beene observed at all; because they are Invisible, and incurre not to the Eye; but yet they are to be deprehended by Experience: As *Democritus* said well, when they charged him to hold, that the World was made of such little Moats, as were seene in the Sunne; *Atomus* (saith he) *necessitate Rationis & Experientiae esse convincitur; Atomum enim nemo unquam vidit*. And therefore the Tumult in the Parts of Solide Bodies, when they are compressed, which is the Cause of all

Experiment
Solitary touch-
ing the
Power of Heat.

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Flight of Bodies thorow the Aire, and of other *Mechanicall Motions*, (as hath beene partly touched before, and shall be thoroughly handled in due place,) is not scene at all. But neverthelesse, if you know it not, or enquire it not attentively and diligently, you shall never be able to discern, and much lesse to produce, a Number of *Mechanicall Motions*. Again, as to the *Motions Corporall*, within the Enclosures of Bodies, whereby the effects (which were mentioned before) passe between the *Spirits*, and the *Tangible Parts*; (which are, *Arefaction*, *Colliquation*, *Concession*, *Maturation*, &c.) they are not at all handled. But they are put off by the Names of *Vertues*, and *Natures*, and *Actions*, and *Passions*, and such other *Logicall Words*.

Experiment
Solitary touch-
ing the
Power of Heat.

99

It is certaine, that of all *Powers* in *Nature*, *Heat* is the chiefe; both in the Frame of *Nature*, and in the workes of *Art*. Certaine it is likewise, that the Effects of *Heat*, are most advanced, when it worketh upon a Body, without losse or dissipation of the Matter; for that ever betrayeth the Account. And therefore it is true, that the power of *Heat* is best perceived in *Distillations*, which are performed in close Vessels, and Receptacles. But yet there is a higher Degree; For howsoever *Distillations* doe keepe the Body in Cells, and Cloysters, without Going abroad, yet they give space unto Bodies to turne into Vapour; To returne into Liquour; And to Separate one part from another. So as *Nature* doth Exspiate, although it hath not full Libertie: whereby the true and Ultimate Operations of *Heat* are not attained. But if *Bodies* may be altered by *Heat*, and yet no such Reciprocation of *Rarefaction*, and of *Condensation*, and of *Separation*, admitted; then it is like that this *Proteus* of *Matter*, being held by the Sleeves, will turne and change into many *Metamorphoses*. Take therefore a *Square vessell* of *Iron*, in forme of a Cube, and let it have good thicke and strong Sides. Put into it a Cube of *wood*, that may fill it as close as may be; And let it have a Cover of *Iron*, as strong (at least) as the Sides; And let it be well Luted, after the manner of the *Chymists*. Then place the *Vessell* within burning *Coales*, kept quicke kindled, for some few houres space. Then take the *Vessell* from the *Fire*, and take off the Cover, and see what is become of the *wood*. I conceive that since all *Inflammation*, and *Evaporation* are utterly prohibited, and the *Body* still turned upon it Selfe, that one of these two Effects will follow: Either that the *Body* of the *wood* will be turned into a kinde of *Amalgama*, (as the *Chymists* call it;) Or that the *Finer Part* will be turned into *Aire*, and the *Grosser* sticke as it were baked, and incrustate upon the Sides of the *Vessell*; being become of a Denser Matter, than the *wood* it selfe, Crude. And for another Triall, take also *water*, and put it in the like *Vessell*, stopped as before; But use a gentler *Heat*, and remove the *Vessell* sometimes from the *Fire*; And againe, after some small time, when it is Cold, renew the *Heating* of it: And repeat this *Alteration* some few times: And if you can once bring to passe, that the *water*, which is one of the Simplest of Bodies, be changed in Colour, Odour, or Taste, after

after the manner of Compound Bodies, you may be sure that there is a great Worke wrought in Nature, and a Notable Entrance made into strange Changes of Bodies, and productions: And also a Way made, to doe that by Fire, in small time, which the Sunne and Age doe in long time. But of the Admirable Effects of this *Distillation in Close*, (for so we call it it) which is like the *wombes* and *Matrices* of living creatures, where nothing Expireth, nor Separateth; Wee will speake fully, in the due place; Not that we Aime at the making of *Paracelsus Pigmey's*; Or any such Prodigious Follies; But that we know the Effects of *Heat* will be such, as will scarce fall under the Conceit of Man; If the force of it be altogether kept in.

THere is nothing more Certaine in Nature, than that it is impossible for any *Body*, to be utterly *Annihilated*; But that, as it was the worke of the Omnipotency of *God*, to make *Somewhat* of *Nothing*; So it requireth the like Omnipotency, to turne *Somewhat* into *Nothing*. And therefore it is well said, by an Obscure Writer of the *se&* of the *Chymists*; That there is no such way to effect the Strange *Transmutations* of *Bodies*, as to endeavour and urge by all meanes, the *Reducing* of them to *Nothing*. And herein is contained also a great Secret of Preservation of Bodies from Change; For if you can prohibit, that they neither turne into *Aire*, because no *Aire* commeth to them; Nor goe into the *Bodies Adjacent*, because they are utterly Heterogeneall; Nor make a *Round* and *Circulation* within themselves; they will never change, though they be in their Nature never so Perishable, or Mutable. Wee see, how *Flies*, and *Spiders*, and the like, get a *Sepulcher* in *Amber*, more Durable, than the *Monument*, and *Embalming* of the *Body* of any *King*. And I conceive the like will be of *Bodies* put into *Quick-silver*. But then they must be but thinne; As a leafe, or a peece of Paper, or Parchment; For if they have a greater Crassitude, they will alter in their owne Body, though they spend not. But of this, We shall speake more, when wee handle the *Title of Conservation of Bodies*.

Experiment
Solitary, tou-
ching the Im-
possibilitie of
Annihilation.

100

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NA-

after the manner of Compound Bodies, you may be sure that there is a great Work wrought in Nature, and a prodigious Humane made into strange Changes of Bodies, and productions: And also a Way made to do that by Fire, in little time, which the Sunne and Air doe in long time. But of the admirable Effects of this Divine Power, (for so we call it) which is like the wisdom and manner of living creatures where nothing is separate, nor separated: We will speake fully in the due place. Not that we Aime at the making of a perfect Man; Or any such Prodigious Follies: But that we know the Effects of it will be such, as will befall under the Concept of Man; If the force of it be altogether kept in.

This is nothing more Certaine in Nature, than that it is impossible for any body to be eternally dissolved; But that as it was the work of the Omnipotency of God to make a new man of Nabal's skin, so it is in the like Omnipotency, to make a new man of Nabal's skin. And therefore it is well said, by an Ovidian Writer of the 8. of the Cyprius: That there is no way to effect the strange Transmutation of bodies, as to endeavour and surely all means, the wisdom of them to Nature. And herein is contained a great secret of Preservation of Bodies from Change: For if you can perceive that they continue in the same state, and no new body is made; Nor made into the body already made, cause the year, the little Heterogeneous; Nor makes a new and Circulation within themselves; they will never change, though they be in the most corruptible of Materials. We see for how long, and spiry, and the like, as a spider in a web, more durable, than the web, and a whole web of the kind of any kind. And I conceive the like will be of a new body, but then they must be put in a new place, as a body out of place, or a body out of place. For if they have any of the same, they will never in their own body, though they be not. But etc. this we shall see more when we handle the Title of Creation.

Experiment
Solvent, for
changing the
passions of
the mind.

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E.



NATVRALL HISTORIE.

II. Century.



MUSICKE in the *Practise*, hath beene well pursued ; And in good Variety ; But in the *Theory*, and especially in the *Teelding* of the *Causes* of the *Practique*, very weakly ; being reduced into certaine Mysticall Subtilties, of no use, and not much Truth. Wee shall therefore, after our manner, joyne the *Contemplative* and *Active Part* together.

Experiments
in Consort
touching Mu-
sicke.

All *Sounds*, are either *Musicall Sounds*, which we call *Tones*, Whereunto there may be an *Harmony* ; which *Sounds* are ever *Equall* ; As *Singing*, the *Sounds* of *Stringed*, and *Wind-Instruments*, the *Ring*ing of *Bells*, &c. Or *Immusicall Sounds* ; which are ever *Unequall* ; Such as are the *Voyce* in *Speaking*, all *whisperings* ; all *Voices* of *Beasts*, and *Birds*, (except they bee *Singing Birds* ;) all *Percussions*, of *Stones*, *wood*, *Parchment*, *Skins* (as in *Drummes* ;) and infinite others.

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The *Sounds* that produce *Tones*, are ever from such *Bodies*, as are in their *Parts* and *Pores* *Equall* ; As well as the *Sounds* themselves are *Equall* ; And such are the *Percussions* of *Metall*, as in *Bells*, Of *Glasse*, as in the *Fillipping* of a *Drinking Glasse* ; Of *Aire*, as in *Mens voices* whilest they *Sing*, in *Pipes*, *Whistles*, *Organs*, *Stringed Instruments*, &c. And of *Water*, as in the *Nightingale-Pipes* of *Regalls*, or *Organs*, and other *Hydraulicks* ; which

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which the *Ancients* had, and *Nero* did so much esteeme, but are now lost. And if any Man thinke, that the *String* of the *Bowe*, and the *String* of the *Viall*, are neither of them *Equall Bodies*; And yet produce *Tones*; he is in an error. For the *Sound* is not created between the *Bowe* or *Plectrum*, and the *String*; But between the *String* and the *Aire*; No more than it is between the *Finger* or *Quill*, & the *String*, in other *Instruments*. So there are (in effect) but three *Percussions* that create *Tones*; *Percussions* of *Metalls*, (comprehending *Glasse*, and the like;) *Percussions* of *Aire*; and *Percussions* of *Water*.

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The *Diapason* or *Eight* in *Musicke* is the sweetest *Concord*; Inso much, as it is in effect an *Unison*; As wee see in *Lutes*, that are strung in the *Bass* *Strings* with two strings, one an *Eight* above another; Which make but as one *Sound*. And every *Eight Note* in *Ascent*, (as from *Eight* to *Fifteene* from *Fifteene* to *twenty two*, and so in *infinitum*), are but *Scales* of *Diapason*. The *Cause* is darke, and hath not beene rendred by any; And therefore would be better contemplated. It seemeth that *Aire*, (which is the Subject of *Sounds*) in *Sounds* that are not *Tones*, (which are all *unequall*, as hath been said) admitteth much *Varietie*; As wee see in the *Voices* of *Living Creatures*; And likewise in the *Voices* of severall *Men*; (for we are capable to discern severall *Men* by their *Voices*;) And in the *Coniugation* of *Letters*, whence *Articulate Sounds* proceed; Which of all others are most various. But in the *Sounds* which we call *Tones*, (that are ever *Equall*) the *Aire* is not able to cast it selfe into any such *varietie*; But is forced to recurre into one and the same *Posture* or *Figure*, only differing in *Greatnesse* and *Smalnesse*. So we see *Figures* may be made of *lines*, *Crooked* and *Straight*, in *infinite Varietie*, where there is *Inequality*; But *Circles*, or *Squares*, or *Triangles Equilaterall*, (which are all *Figures*, of *Equall lines*) can differ but in *Greater*, or *Lesser*.

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It is to be noted (the rather lest any Man should thinke, that there is any thing in this *Number* of *Eight*, to create the *Diapason*), that this *Computation* of *Eight*, is a thing rather received, than any true *Computation*. For a true *Computation* ought euer to bee, by *Distribution* into *equall Portions*. Now there be intervenient in the *Rise* of *Eight* (in *Tones*) two *Beemolls*, or *Half-notes*; So as if you diuide the *Tones* equally, the *Eight* is but *Seuen* whole and *equall Notes*; And if you subdiuide that into *Halfe Notes*, (as it is in the *Stops* of a *Lute*), it maketh the *Number* of *thirteene*.

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Yet this is true; That in the ordinarie *Rises* and *Falls* of the *Voice* of *Man*, (not measuring the *Tone* by whole *Notes*, and halfe *Notes*, which is the *Equall Measure*;) there fall out to be two *Beemolls* (as hath beene said) betweene the *Unison* and the *Diapason*: And this *Varying* is naturall. For if a Man would endeavour to raise or fall his *Voice*, still by *Halfe Notes*, like the *Stops* of a *Lute*; or by whole *Notes* alone, without *Halves*; as farre as an *Eight*; he will not be able to frame his *Voice* unto it. Which sheweth, that after every three whole *Notes* Nature requireth, for all *Harmonicall use*, one *halfe Note* to be intrepoused.

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It is to be considered, that whatsoever *Vertue* is in *Numbers*, for
Conducing

Conducing to Conccent of Notes, is rather to bee ascribed to the *Ante-Number*, than to the *Entire Number*; As namely, that the Sound returneth after Six, or after Twelve; So that the *Seventh*, or the *Thirteenth* is not the Matter, but the *Sixth*, or the *Twelfth*; And the *Seventh* and the *Thirteenth* are but the limits and Boundaries of the returne.

The *Concords* in *Musick* which are *Perfect*, or *Semiperfect*, betweene the *Unison*, and the *Diapason*, are the *Fifth*, which is the most *Perfect*; the *Third* next; And the *Sixth* which is more harsh: And as the Ancients esteemed, and so do my selfe and some Other yet, the *Fourth* which they call *Diatefferon*. As for the *Tenth*, *Twelfth*, *Thirteenth*, and so in *Infinitem*; they be but *Recurrences* of the Former; viz. of the *Third*, the *Fifth*, and the *Sixth*; being an *Eight* respectively from them.

For *Discords*, the *Second*, and the *Seventh*, are of all others the most odious, in *Harmony*, to the *Sense*; wherof the One is next above the *Unison*, the Other next under the *Diapason*: which may shew, that *Harmony* requireth a competent distance of Notes.

In *Harmony*, if there be not a *Discord* to the *Base*, it doth not disturbe the *Harmony*, though there bee a *Discord* to the *Higher Parts*; So the *Discord* be not of the Two that are Odious; And therefore the ordinary Conccent of *Foure Parts* consisteth of an *Eight*, a *Fifth*, and a *Third* to the *Base*: But that *Fifth* is a *Fourth* to the *Treble*, and the *Third* is a *Sixth*. And the Cause is, for that the *Base* striking more Aire, doth overcome and drowne the *Treble*, (unlesse the *Discord* bee very Odious;) And so hideth a small Imperfection. For wee see, that in one of the lower *Strings* of a *Lute*, there soundeth not the Sound of the *Treble*, nor any *Mixt Sound*, but onely the Sound of the *Base*.

Wee have no *Musick* of *Quarter-Notes*; And it may be, they are not capable of *Harmony*; For wee see the *Halfe-Notes* themselves doe but interpose sometimes. Nevertheless wee have some *Slides* or *Relishes*, of the Voice, or *Strings*, as it were continued without Notes, from one Tone to another, rising or falling, which are delightfull.

The Causes of that which is *Pleasing*, or *Ingrate* to the *Hearing*, may receive light by that, which is *Pleasing* or *Ingrate* to the *Sight*. There bee two Things *Pleasing* to the *Sight*, (leaving *Pictures*, and *Shapes* aside, which are but *Secondary Objects*; And please or displease but in *Memory*;) these two are, *Colours*, and *Order*. The pleasing of *Colour* symbolizeth with the *Pleasing* of any *Single Tone* to the *Eare*. But the *Pleasing* of *Order* doth symbolize with *Harmony*. And therefore wee see in *Garden-knots*, and the *Frets of Houses*, and all equall and well-answering *Figures*, (as *Globes*, *Pyramides*, *Cones*, *Cylinders*, &c.) how they please; whereas *unequall Figures* are but *Deformities*. And both these *Pleasures*, that of the *Eye*, and that of the *Eare*, are but the Effects of *Equality*; *Good Proportion*, or *Correspondence*: So that (out of *Question*;) *Equality*, and *Correspondence*, are the Causes of *Harmony*. But to finde the *Proportion* of that *Correspondence*, is more abstruse; whereof notwithstanding we shall speake somewhat, (when wee handle *Tones*;) in the generall Enquiry of
Tones

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112

Tones are not so apt altogether to procure Sleep, as some other Sounds, As the wind, the Purling of water, Humming of Bees, a Sweet Voice of one that readeth, &c. The Cause whereof is, for that Tones, because they are Equall, and slide not, doe more strike and erect the Sense, than the other. And Overmuch Attention hindreth Sleep.

113

There be in Musick certaine Figures, or Tropes; almost agreeing with the Figures of Rhetoricke; And with the Affections of the Minde, and other Senses. First, the Division and Quavering, which please so much in Musick, have an Agreement with the Glittering of Light, As the Moone-Beames playing upon a Wave. Againe, the Falling from a Discord to a Concord, which maketh great Sweetnesse in Musick, hath an Agreement with the Affections, which are reintegrated to the better, after some dislikes: It agreeth also with the Taste, which is soone glatted with that which is sweet alone. The Sliding from the Close or Cadence, hath an Agreement with the Figure in Rhetoricke, which they call *Præter Expectatum*; For their is a Pleasure even in Being deceived. The Reports, and Paces, have an Agreement with the Figures in Rhetoricke, of Repetition, and Tradition. The Tripla's, and Changing of times, have an Agreement with the Changes of Motions; As when Galliard Time, and Measure Time, are in the Medley of one Dance.

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It hath beene anciently held, and observed, that the Sense of Hearing, and the Kinde of Musick, have most Operation upon Manners; As to Incourage Men, and make them Warlike; To make them Soft and Effeminate; To make them Grave; To make them Light; To make them Gentle and inclind to Pity &c. The Cause is, for that the Sense of Hearing striketh the Spirits more immediately, than the other Senses; And more incorporeally than the Smelling: For the Sight, Taste, and Feeling, have their Organs, not of so present and immediate Access to the spirits, as the Hearing hath. And as for the Smelling, (which indeed worketh also immediately upon the spirits, and is forcible while the Object remaineth,) it is with a communication of the Breath, or Vapour of the Object Odorate: But Harmony entring easily, and Mingling not at all, and Comming with a manifest Motion, doth by Custome of often Affecting the spirits, and Putting them into one kinde of Posture, alter not a little the Nature of the spirits, even when the Object is removed. And therefore we see, that Tunes and Aires, even in their owne Nature, have in themselves some Affinity with the Affections; As there bee Merry Tunes, Dolefull Tunes, Solemne Tunes; Tunes inclining Mens mindes to Pity; Warlike Tunes, &c. So as it is no Marvell, if they alter the spirits; considering that Tunes have a Predisposition to the Motion of the spirits in themselves. But yet it hath been noted, that though this variety of Tunes, doth dispose the spirits to variety of Passions, conforme unto them; yet generally, Musick feedeth that disposition of the spirits which it findeth. We see also that severall Aires, and Tunes, doe please severall Nations, and Peoples, according to the Sympathy they have with their spirits.

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Experiments
in Consort
touching
Sounds; and
first touching
the Nullity,
and Entity of
Sounds.

Perspective hath been with some diligence inquired; And so hath the *Nature of Sounds*, in some sort, as far as concerneth *Musick*. But the *Nature of Sounds* in generall, hath beene superficially observed. It is one of the subtillest Peeces of Nature. And besides, I practise, as I doe advise; which is, after long Inquiry of Things, Immerse in Matter, to interpose some Subject, which is Immaterial, or lesse Material; Such as this of *Sounds*; To the end, that the *Intellect* may be Rectified, and become not Partiall.

It is first to be considered, what *Great Motions* there are in Nature, which passe without *Sound*, or *Noise*. The *Heavens* turne about, in a most rapide Motion, without *Noise* to us perceived; Though in some *Dreames* they have been said to make an excellent *Musick*. So the *Motions* of the *Comets*, and *Fiery Meteors* (as *Stella Cadens*, &c.) yeeld no *Noise*. And if it bee thought, that it is the Greatnesse of distance from us, whereby the *Sound* cannot bee heard; Wee see that *Lightnings*, and *Coruscations*, which are neere at hand, yeeld no *Sound* neither. And yet in all these, there is a Percussion and Division of the *Aire*. The *windes* in the *Vpper Region* (which move the *Clouds* above (which wee call the *Racke*) and are not perceived below) passe without *Noise*. The *lower Windes* in a *Plaine*, except they be strong, make no *Noise*; But amongst *Trees*, the *Noise*, of such *windes* will be perceived. And the *windes* (generally) when they make a *Noise*, doe ever make it unequally, Rising and Falling, and sometimes (when they are vehement,) Trembling at the Height of their Blast, *Raine*, or *Haile* falling, (though vehemently,) yeeldeth no *Noise*, in passing through the *Aire*, till it fall upon the *Ground*, *Water*, *Houses*, or the like. *Water* in a *River* (though a swift *Streame*) is not heard in the *Channell*, but runneth in Silence, if it be of any depth; But the very *Streame* upon *Shallowes*, of *Gravell*, or *Pebble*, will bee heard. And *Waters*, when they beat upon the *Shore*, or are straitned, (as in the falls of *Bridges*;) Or are dashed against themselves, by *windes*, give a *Roaring Noise*. Any *peece of Timber*, or *Hard Body*, being thrust forwards by another *Body* Contiguous, without knocking, giveth no *Noise*. And so *Bodies* in weighing, one upon another, though the *upper Body* presse the *lower Body* downe, make no *Noise*. So the *Motion* in the *Minute Parts* of any *Solide Body*, (which is the Principall Cause of *Violent Motion*, though unobserved;) passeth without *Sound*; For that *Sound*, that is heard sometimes, is produced onley by the Breaking of the *Aire*; And not by the Impulsion of the *Parts*. So it is manifest; That where the *Anterior Body* giveth way, as fast as the *Posterior* commeth on, it maketh no *Noise*; bee the *Motion* never so great, or swift.

Aire open, and at large, maketh no *Noise*, except it bee sharply percussed; As in the *Sound* of a *String*, where *Aire* is percussed by a hard, and

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and stiffe Body; And with a sharp loose; For if the String be not straitned, it maketh no *Noise*. But where the *Aire* is pent, and straitned, there Breath, or other Blowing, (which carry but a gentle Percussion,) suffice to create *Sound*; As in *Pipes*, and *winde-Instruments*. But then you must note, that in *Recorders*, which goe with a gentle Breath, the *Concave* of the *Pipe*, were it not for the *Fipple*, that straitneth the *Aire*, (much more than the *Simple Concave*;) would yeeld no *Sound*. For as for other *winde-Instruments*, they require a forcible Breath; As *Trumpets*, *Cornets*, *Hunters-hornes*, &c. Which appeareth by the blowne-cheeks of him that windeth them. *Organs* also are blowne with a strong winde, by the *Bellows*. And note againe, that some kinde of *winde-Instruments*, are blowne at a small Hole in the side, which straitneth the Breath at the first Entrance; The rather, in respect of their *Traverse*, and *Stop* above the Hole, which performeth the *Fipples Part*; As it is seene in *Flutes*, and *Fifes*, which will not give *Sound*, by a Blast at the end, as *Recorders*, &c. doe. Likewise in all *Whistling*, you contract the Mouth; And to make it more sharp, Men sometimes use their Finger. But in *Open Aire*, if you throw a Stone, or a Dart, they give no *Sound*: No more doe *Bullets*, except they happen to be a little hollowed in the Casting; Which Hollownesse penneth the *Aire*; Nor yet *Arrowes*, except they bee ruffled in their Feathers, which likewise penneth the *Aire*. As for *Small whistles*, or *Shepherds Oaten Pipes*; they give a *Sound*, because of their extreme Slendernesse, whereby the *Aire* is more pent, than in a *Wider Pipe*. Againe, the *Voices* of *Men*, and *Living Creatures*, passe through the throat, which penneth the Breath. As for the *Iewes Harp*, it is a sharp Percussion; And besides, hath the vantage of penning the *Aire* in the Mouth.

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Solide Bodies, if they be very softly percussed, give no *Sound*; As when a man treadeth very softly upon *Boards*. So *Chests* or *Doores* in faire weather, when they open easily, give no *Sound*. And *Cart-wheeles* squeak not when they are liquoured.

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The *Flame* of *Tapers*, or *Candles*, though it bee a swift Motion, and breaketh the *Aire*, yet passeth without *Sound*. *Aire* in *Ovens*, though (no doubt) it doth (as it were) boyle, and dilate it selfe, and is repercussed; yet it is without *Noise*.

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Flame percussed by Aire, giveth a *Noise*; As in Blowing of the Fire by *Bellows*; Greater, than if the *Bellows* should blow upon the *Aire* it selfe. And so likewise *Flame percussing the Aire strongly*, (as when *Flame* suddenly taketh and openeth,) giveth a *Noise*; So, *Great Flames*, whiles the one impellerh the other, give a bellowing *Sound*.

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There is a Conceit runneth abroad, that there should bee a *white Powder*, which will discharge a Peece without *Noise*; which is a dangerous Experiment, if it should be true: For it may cause secret Murthers. But it seemeth to me impossible; For, if the *Aire* pent, bee driven forth, and strike the *Aire* open, it will certainly make a *Noise*. As for the *white Powder* (if any such thing bee, that may extinguish, or dead the *Noise*;) it

it is like to be a Mixture of *Petre*, and *Sulphur*, without *Coale*. For *Petre* alone will not take Fire. And if any Man thinke, that the *Sound* may be extinguished, or deadened, by discharging the *Pent Aire*, before it cometh to the Mouth of the *Peece*, and to the *Open Aires*; That is not probable; For it will make more divided *Sounds*: As if you should make a *Crosse Barrell* hollow, thorow the Barrell of a *Peece*, it may be, it would give severall *Sounds*, both at the Nose, and at the Sides. But I conceive, that if it were possible, to bring to passe, that there should be no *Aire* pent at the Mouth of the *Peece*, the *Bullet* might fly with small, or no *Noise*. For first it is certaine, there is no *Noise* in the Percussion of the *Flame* upon the *Bullet*. Next the *Bullet*, in piercing thorow the *Aire*, maketh no *Noise*, As hath beene said. And then, if there be no *Pent Aire*, that striketh upon *Open Aire*, there is no Cause of *Noise*; And yet the Flying of the *Bullet* will not be stayed. For that *Motion* (as hath beene oft said) is in the Parts of the *Bullet*, and not in the *Aire*. So as tryall must be made by taking some small *Concave* of *Metall*, no more than you mean to fill with *Powder*; And laying the *Bullet* in the Mouth of it, halfe out into the *Open Aire*.

I heard it affirmed by a Man, that was a great Dealer in Secrets, but he was but vaine; That there was a *Conspiracy* (which himselfe hindered,) to have killed *Queene Mary*, Sister to *Queene Elizabeth*, by a *Burning-Glasse*, when shee walked in *Saint James Parke*, from the Leads of the House. But thus much (no doubt) is true; That if *Burning Glasses* could be brought to a great strength, (as they talke generally of *Burning Glasses*, that are able to burne a *Navie*;) the Percussion of the *Aire* alone, by such a *Burning Glas*, would make no *Noise*; No more than is found in *Coruscations*, and *Lightnings*, without *Thunders*.

I suppose, that *Impression* of the *Aire* with *Sounds*, asketh a time to be conveyed to the *Sense*; As well as the *Impression* of *Species visibile*. Or else they will not be heard. And therefore, as the *Bullet* moveth so swift, that it is *Invisible*; So the same *Swiftnesse* of *Motion* maketh it *Inaudible*: For we see, that the *Apprehension* of the *Eye*, is quicker than that of the *Eare*.

All *Eruptions* of *Aire*, though small and slight, give an *Emission* of *Sound*; which we call *Crackling*, *Puffing*, *Spitting*, &c. As in *Bay-salt*, and *Bay-leaves*, cast into the *Fire*; So in *Chestnuts*, when they leape forth of the *Ashes*; So in *Green Wood* laid upon the *Fire*, especially *Roots*; So in *Candles* that spit *Flame*, if they be wet; So in *Hisping*, *Sweeing*, &c. So in a *Rose-leaf* gathered together into the fashion of a *Purse*, and broken upon the *Fore-head*, or *Backe* of the *Hand*, as *Children* use.

The Cause given of *Sound*, that it should be an *Blister* of the *Aire* (whereby, if they meane any thing, they meane a *Concussion*, or *Disturbance*, or else an *Attenuating* of the *Aire*) is but a *Term* of *Ignorance*: And the *Motion* is but a *Catch* of the *Wit* upon a few *Instances*; As the *Manner* is in the *Philosophy* Received. And it is common with Men, that if

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they have gotten a Pretty Expression, by a Word of Art, that Expression goeth current, though it be empty of Matter. This Conceit of *Elision*, appeareth most manifestly to be false, in that the Sound of a Bell, String, or the like, continueth melting, sometime, after the Percussion; But ceaseth straight-ways, if the Bell, or String, be touched and stayed: whereas, if it were the *Elision* of the Air, that made the Sound, it could not be, that the Touch of the Bell, or String, should extinguish so suddenly that Motion, caused by the *Elision* of the Air. This appeareth yet more manifestly, by *Chiming* with a Hammer, upon the Out-side of a Bell; For the Sound will be according to the inward Concave of the Bell; whereas the *Elision*, or *Attenuation* of the Air, cannot be but onely betweene the Hammer, and the Out-side of the Bell. So againe, if it were an *Elision*, a broad Hammer, and a Bodkin, strucke upon Metall, would give a diuers Tone; As well as a diuers Loudnesse. But they doe not so; For though the Sound of the one be Louder, and of the other Softer, yet the Tone is the same. Besides, in *Echo's* (whereof some are as loud as the Originall Voice,) there is no new *Elision*; but a *Repercussion* onely. But that which convinceth it most of all, is; that Sounds are generated, where there is no Air at all. But these and the like Conceits, when Men have cleared their understanding, by the light of Experience, will scatter, and breake up like a Mist.

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It is certaine, that Sound is not produced at the first, but with some Local Motion of the Air, or Flame, or some other Medium; Nor yet without some Resistance, either in the Air, or the Body Percussed. For if there be a mere Yielding, or Cession, it produceth no Sound; As hath bene said. And therein Sounds differ from Light, and Colours; which passe thorow the Air, or other Bodies, without any Local Motion of the Air; either at the first, or after. But you must attentively distinguish, betweene the Local Motion of the Air, (which is but *Vehiculum Causse*, A Carrier of the Sounds,) and the Sounds themselves, Conveighed in the Air. For as to the former, we see manifestly, that no Sound is produced (no not by Air it selfe against other Air, as in Organs, &c.) but with a perceptible Blast of the Air; And with some Resistance of the Air stricken. For even all Speech, (which is one of the gentlest Motions of Air,) is with Expulsion of a little Breath. And all Pipes have a Blast, as well as a Sound. We see also manifestly, that Sounds are carried with Wind: And therefore sounds will be heard further with the Wind, than against the Wind; And likewise doe rise and fall with the Intension or Remission of the Wind. But for the Impression of the Sound, it is quite another Thing; And is utterly without any Local Motion of the Air, Perceptible; And in that resembleth the Species visible: For after a Man hath lured, or a Bell is rung, wee cannot discern any Perceptible Motion (at all) in the Air, along as the Sound goeth; but onely at the first. Neither doth the Wind (as far as it carrieth a Voice,) with the Motion thereof, confound any of the Delicate, and Articulate Figurations of the Air, in Varietie of Words. And if a Man speake a good loudnesse, against the

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the *Flame* of a *Candle*, it will not make it tremble much; though most, when those *Letters* are pronounced, which contract the *Mouth*; As *F*, *S*, *V*, and some others. But *Gentle Breathing*, or *Blowing* without *speaking*, will move the *Candle* far more. And it is the more probable, that *Sound* is without any *Locall Motion* of the *Aire*, because as it differeth from the *Sight*, in that it needeth a *Locall Motion* of the *Aire* at first; So it paralleleth in so many other things with the *Sight*, and *Radiation* of *Things* visible; Which (without all question) induce no *Locall Motion* in the *Aire*, as hath beene said.

Neverthelesse it is true, that upon the *Noise* of *Thunder*, and great *Ordnance*; *Glasse* windowes will shake; and *Fishes* are thought to be frayed with the *Motion*, caused by *Noise* upon the water. But these Effects are from the *Locall Motion* of the *Aire*, which is a *Concomitant* of the *Sound*, (as hath beene said;) and not from the *Sound*.

It hath beene anciently reported, and is still received, that *Extreme Applauses*, and *Shouting* of *People* assembled in great *Multitudes*, have so rarified, and broken the *Aire*, that *Birds* flying over, have fallen downe, the *Aire* being not able to support them. And it is beleevd by some, that *Great Ringing* of *Bells* in populous *Cities*, hath chased away *Thunder*: and also dissipated *Pestilent Aire*: All which may be also from the *Concussion* of the *Aire*, and not from the *Sound*.

A very great *Sound*, neare hand, hath stricken many *Deafe*; And at the *Instant* they have found, as it were, the breaking of a *Skin* or *Parchment* in their *Eare*: And my *Selfe* standing neare one that *Lured* loud, and shrill, had suddenly an *Offence*, as if somewhat had broken, or beene dislocated in my *Eare*; And immediately after, a *loud Ringing*; (Not an ordinary *Singing*, or *Hissing*, but far louder, and differing;) so as I feared some *Deafenesse*. But after some halfe *Quarter* of an *Hour* it vanished. This Effect may be truly referred unto the *Sound*: For (as is commonly received) an *over-potent Object* doth destroy the *Sense*; And *spirituall Species*, (both *Visible*, and *Audible*,) will worke upon the *Sensories*, though they move not any other *Body*.

In *Delation* of *Sounds*, the *Enclosure* of them preserveth them, and causeth them to be heard further. And wee finde in *Rowles* of *Parchment*, or *Trunckes*, the *Mouth* being laid to the one end of the *Rowle* of *Parchment*, or *Truncke*, and the *Eare* to the other, the *Sound* is heard much further, than in the *Open Aire*. The Cause is, for that the *Sound* spendeth, and is dissipated in the *Open Aire*; But in such *Concaves* it is conserved, and contracted. So also in a *Peece* of *Ordnance*, if you speake in the *Touch-hole*, and another lay his *Eare* to the *Mouth* of the *Peece*, the *Sound* passeth, and is farre better heard, than in the *Open Aire*.

It is further to be considered, how it proveth and worketh, when the *Sound* is not enclosed all the *Length* of his *Way*, but passeth partly through *open Aire*; As where you speake some distance from a *Truncke*, or where the *Eare* is some distance from the *Truncke*, at the other *End*, Or where both *Mouth* and *Eare* are distant from the *Truncke*. And

it is tried, that in a long *Truncke*, of some eight or ten foot, the *Sound* is holpen, though both the *Mouth*, and the *Eare* be a handfull, or more, from the Ends of the *Truncke*; And somewhat more holpen, when the *Eare* of the *Hearer* is neare, than when the *Mouth* of the *Speaker*. And it is certaine, that the *Voice* is better heard in a *Chamber* from *abroad*, than *abroad* from within the *Chamber*.

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As the *Enclosure*, that is *Round about and Entire*, preserveth the *Sound*; So doth a *Semi-Concave*, though in a lesse degree. And therefore, if you divide a *Truncke*, or a *Cane* into two, and one speake at the one end, and you lay your *Eare* at the other, it will carry the *Voice* further, than in the *Aire* at large. Nay further, if it be not a full *Semi-Concave*; but if you doe the like upon the *Mast* of a *Ship*, or a long *Pole*, or a *Pece* of *Ordnance* (though one speake upon the *Surface* of the *Ordnance*, and not at any of the *Bores*;) the *Voice* will be heard further, than in the *Aire* at large.

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It would be tried, how, and with what proportion of disadvantage, the *Voice* will be carried in an *Horne*, which is a line *Arched*; Or in a *Trumpet*, which is a line *Retorted*; Or in some *Pipe* that were *Sinuious*.

133

It is certaine, (howsoever it crosse the Received Opinion) that *Sounds* may be created without *Aire*, though *Aire* be the most favourable *Deferent* of *Sounds*. Take a *Vessell* of *Water*, and knap a paire of *Tongs* some depth within the *Water*, and you shall heare the *Sound* of the *Tongs* well, and not much diminished; And yet there is no *Aire* at all present.

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Take one *Vessell* of *Silver*, and another of *Wood*, and fill each of them full of *Water*, and then knap the *Tongs* together, as before, about an handfull from the *Bottom*; and you shall finde the *Sound* much more *Resounding* from the *Vessell* of *Silver*, than from that of *wood*: And yet if there be no *water* in the *Vessell*, so that you knap the *Tongs* in the *Aire*, you shall finde no difference, betweene the *Silver* and *Woodden* *Vessell*. Whereby, beside the maine point of creating *Sound* without *Aire*, you may collect two Things: The one, that the *Sound* communiceth with the *Bottom* of the *Vessell*: The other, that such a *Communication* passeth farre better, thorow *water*, than *Aire*.

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Strike any *Hard Bodies* together, in the *Middest* of a *Flame*, and you shall heare the *Sound*, with little difference, from the *Sound* in the *Aire*.

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The *Pneumaticall Part*, which is in all *Tangible Bodies*, and hath some *Affinitie* with the *Aire*, performeth, in some degree, the *Parts* of the *Aire*; As when you knocke upon an *Emptie Barrell*, the *Sound* is (in part) created by the *Aire* on the *Out-side*; And (in part) by the *Aire* in the *Inside*; For the *Sound* will be greater or lesser, as the *Barrell* is more *Emptie*, or more full; But yet the *Sound* participateth also with the *spirit* in the *Wood*, thorow which it passeth, from the *Out-side* to the *In-side*: And so it cometh to passe, in the *Chiming* of *Bells*, on the *Out-side*; where also the *Sound* passeth to the *In-side*. And a number of o-

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ther like Instances, whereof we shall speake more, when we handle the Communication of Sounds.

It were extreame Grossenesse to thinke, (as wee have partly touched before,) that the *Sound* in *Strings* is made, or produced, betweene the *Hand* and the *String*, or the *Quill* and the *String*, or the *Bow* and the *String*: For those are but *Vehicula Motus*, *Passages* to the *Creation* of the *Sound*; the *Sound* being produced betweene the *String* and the *Aire*; And that not by any *Impulsion* of the *Aire* from the first *Motion* of the *String*; but by the *Returne* or *Result* of the *String*, which was strained by the *Touch*, to his former Place: which *Motion* of *Result* is quicke and sharpe; Whereas the first *Motion*, is soft and dull. So the *Bow* tortureth the *String* continually, and thereby holdeth it in a *Continuall Trepidation*.

TAKE a *Truncke*, and let one whistle at the one End, and hold your Eare at the other, and you shall finde the *Sound* strike so sharpe, as you can scarce endure it. The *Cause* is, for that *Sound* diffuseth it selfe in round; And so spendeth it Selfe; But if the *Sound*, which would scatter in *Open Aire*, be made to goe all into a *Canale*; It must needs give greater force to the *Sound*. And so you may note, that *Enclosures* doe not onely preserve *Sound*, but also Encrease and Sharpen it.

A *Hunters Horne*, being greater at one end, than at the other, doth encrease the *Sound* more, than if the *Horne* were all of an equall Bore. The *Cause* is, for that the *Aire*, and *Sound*, being first contracted at the lesser End, and afterwards having more Roome to spread at the greater End; doe dilate themselves; And in Comming out strike more *Aire*; whereby the *Sound* is the Greater, and Baser. And even *Hunters Hornes*, which are sometimes made straight, and not Oblique, are ever greater at the lower end. It would be tried also in *Pipes*, being made far larger at the lower end: Or being made with a *Belly* towards the lower End; And then issuing into a straight *Concave* againe.

There is in *Saint James Fields*, a *Conduit* of *Bricke*, unto which joyneth a low *Vault*; And at the End of that, a *Round House* of *Stone*: And in the *Bricke Conduit* there is a *Window*; And in the *Round House* a *Slit* or *Rift* of some little breadth: If you cry out in the *Rift*, it will make a fearfull *Roaring* at the *Window*. The *Cause* is the same with the former; For that all *Concaves*, that proceed from more *Narrow* to more *Broad*, doe amplifie the *Sound* at the Comming out.

Hawkes Bells, that have *Holes* in the *Sides*, give a greater Ring, than if the *Pellet* did strike upon *Brasse*, in the *Open Aire*. The *Cause* is the same with the first Instance of the *Truncke*; Namely, for that the *Sound* Enclosed with the *Sides* of the *Bell*, commeth forth at the *Holes* unspent, and more strong.

In *Drums*, the Closenesse round about, that preserveth the *Sound* from dispersing, maketh the *Noise* come forth at the *Drum-Hole*, farre more loud, and strong, than if you should strike upon the like *skin*, extended

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tended in the Open Aire. The Cause is the same with the two precedent.

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Sounds are better heard, and further off, in an Evening, or in the Night, than at the Noone, or in the Day. The Cause is, for that in the Day, when the Aire is more Thin, (no doubt) the Sound pierceth better; But when the Aire is more Thicke, (as in the Night) the Sound spendeth and spreadeth abroad lesse: And so it is a Degree of Enclosure. As for the Night, it is true also, that the Generall Silence helpeth.

144

There be two Kinds of Reflexions of Sounds; The one at Distance, which is the *Echo*; Wherein the *Originall* is heard distinctly, and the *Reflexion* also distinctly; Of which we shall speake hereafter: The other in *Concurrence*; When the Sound Reflecting (the *Reflexion* being neare at hand) returneth immediatly upon the *Originall*, and so iterateth it not, but amplifieth it. Therefore we see, that *Musike* upon the water soundeth more; And so likewise *Musike* is better in Chambers Wainscotted, than Hanged.

145

The Strings of a Lute, or Violl, or Virginalls, doe give a far greater Sound, by reason of the Knot, and Board, and Concave underneath, than if there were nothing but onely the Flat of a Board, without that Hollow and Knot, to let in the Upper Aire into the Lower. The Cause is, the Communication of the Upper Aire with the Lower; And Penning of both from Expencc, or Dispersing.

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An *Irish Harpe* hath Open Aire on both sides of the Strings: And it hath the Concave or Belly, not along the Strings, but at the End of the Strings. It maketh a more Resounding Sound, than a *Bandora*, *Orpharion*, or *Citterne*, which have likewise Wire-strings. I judge the Cause to be, for that Open Aire on both Sides helpeth, so that there be a Concave; Which is therefore best placed at the End.

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In a *Virginall*, when the Lid is downe, it maketh a more exile sound, than when the Lid is open. The Cause is, for that all shutting in of Aire, where there is no competent Vent, dampeth the Sound: Which maintaineth likewise the former Instance; For the Belly of the Lute, or Violl, doth pen the Aire somewhat.

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There is a Church at *Glocester*, (and as I have heard the like is in some other places;) where if you speake against a Wall, softly, another shall heare your Voice better a good way off, than neare hand. Enquire more particularly of the Frame of that Place. I suppose there is some Vault, or Hollow, or Isle, behinde the Wall, and some Passage to it towards the further end of that Wall, against which you speake; Soas the Voice, of him that speaketh, slideth along the Wall, and then entreth at some Passage, and communicateth with the Aire of the Hollow; For it is preserved somewhat by the plaine wall; but that is too weake to give a Sound Audible, till it hath communicated with the backe Aire.

149

Strike upon a Bow-string, and lay the Horne of the Bow neare your Eare, and it will encrease the Sound, and make a degree of a Tone. The Cause is, for that the Sensory, by reason of the Close Holding, is percussed,

cuffed, before the Aire disperſeth. The like is, if you hold the *Horne* betwixt your Teeth. But that is a plaine *Delation* of the *Sound*; from the Teeth, to the Instrument of Hearing; For there is a great Entercourse between thoſe two Parts; As appeareth by this; That a Harſh *Grating Tune* ſetteth the Teeth on edge. The like falleth out, if the *Horne* of the *Bow* be put upon the Temples; But that is but the Slide of the *Sound* from thence to the Eare.

If you take a *Rod* of Iron, or *Brasse*, and hold the one end to your Eare, and ſtrike upon the other, it makeh a far greater *Sound*, than the like Stroke upon the *Rod*, not ſo made Contiguous to the Eare. By which, and by ſome other *Instances*, that have beene partly touched, it ſhould appeare; That *Sounds* doe not onely ſlide upon the Surface of a Smooth Body, but doe alſo communicate with the Spirits, that are in the Pores of the Body.

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I remember in *Trinitie Colledge* in *Cambridge*, there was an *Vpper Chamber*, which being thought weake in the Rooſe of it, was ſupported by a Pillar of Iron, of the bigneſſe of ones Arme, in the middeſt of the Chamber; Which if you had ſtrucke, it would make a little flat Noiſe in the *Roome* where it was ſtrucke; But it would make a great Bombe in the *Chamber* beneath.

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The *Sound* which is made by *Buckets* in a *well*, when they touch upon the *water*; Or when they ſtrike upon the ſide of the *well*; Or when two *Buckets* daſh the one againſt the other; Theſe *Sounds* are deeper, and fuller, than if the like Percuſſion were made in the *Open Aire*. The *Cauſe* is, the Penning and Encloſure of the Aire, in the Concave of the *well*.

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Barrells placed in a *Roome* under the Floare of a *Chamber*, make all *Noiſes* in the ſame Chamber, more Full and Reſounding.

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So that there be five wayes (in generall,) of Majoration of Sounds: Encloſure Simple; Encloſure with Dilatation; Communication; Reflexion Concurrent; and Approach to the Senſory.

For *Exilitie* of the *Voice*, or other *Sounds*: It is certaine, that the *Voice* doth paſſe thorow *Solide* and *Hard Bodies*, if they be not too thick. And thorow *Water*; which is likewise a very Cloſe Body, and ſuch an one, as letteth not in Aire. But then the *Voice*, or other *Sound*, is reduced, by ſuch paſſage, to a great *Weakneſſe*, or *Exilitie*. If therefore you ſtop the *Holes* of a *Hawkes Bell*, it will make no Ring, but a flat Noiſe, or Rattle. And ſo doth the *Aſcites*, or *Eagles Stone*, which hath a little Stone within it.

154

And as for *Water*, it is a certaine Triall: Let a Man goe into a *Bath*, and take a *Paile*, and turne the Bottom upward, and carry the Mouth of it, (Even,) downe to the Levell of the *Water*; and ſo preſſe it downe under the *Water*, ſome handfull and an halfe, ſtill keeping it even, that it may not tilt on either ſide, and ſo the Aire get out: Then let him that is in the *Bath*, dive with his Head ſo far under *water*, as he may put his Head into the *Paile*; and there will come as much *Aire* bubling forth, as will make

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make Roome for his Head. Then let him speake; and any that shall stand without, shall heare his *Voice* plainly; but yet made extreme sharpe and exile, like the *Voice* of *Puppets*; But yet the *Articulate Sounds* of the *Words* will not be confounded. Note that it may be much more handsomely done, if the *Paile* be put over the Mans head above *Water*, and then he cower downe, and the *Paile* be pressed downe with him. Note that a Man must kneele or sit, that he may be lower than the *Water*. A Man would thinke, that the *Sicilian Poet* had knowledge of this *Experiment*; For he saith; That *Hercules Page Hylas* went with a *Water-pot*, to fill it at a pleasant *Fountaine*, that was neere the *Shore*, and that the *Nymphs* of the *Fountaine* fell in love with the Boy, and pulled him vnder *Water*, keeping him alive; And that *Hercules* missing his *Page*, called him by his Name, aloud, that all the *Shore* rang of it; And that *Hylas* from within the *Water*, answered his Master; But (that which is to the present purpose) with so small and exile a *Voice*, as *Hercules* thought he had beene three miles off, when the *Fountaine* (indeed) was fast by.

156 In *Lutes*, and *Instruments* of *Strings*, if you stop a *String* high, (whereby it hath lesse *Scope* to tremble) the *Sound* is more *Treble*, but yet more dead.

157 Take two *sawcers*, and strike the *Edge* of the one against the *Bottom* of the other, within a *Paile* of *Water*; And you shall finde, that as you put the *Sawcers* lower, and lower, the *Sound* groweth more flat; even while Part of the *Sawcer* is above the *Water*; But that *Flatnesse* of *Sound* is joyned with a *Harshnesse* of *Sound*; which (no doubt) is caused by the *Inequality* of the *Sound*, which commeth from the Part of the *Sawcer* under the *Water*, and from the Part above. But when the *Sawcer* is wholly under the *Water*, the *Sound* becommeth more cleare, but farre more low; And as if the *Sound* came from a farre off.

158 A *Soft Body* dampeth the *Sound*, much more than a *Hard*: As if a *Bell* hath *Cloth*, or *Silke* wrapped about it, it deadeth the *Sound* more, than if it were *Wood*. And therefore in *Clericalls*, the *Keyes* are lined; And in *Colledges* they use to line the *Tablemen*.

159 Triall was made in a *Recorder*, after these severall manners. The *Bottom* of it was set against the *Palme* of the *Hand*; stopped with *Wax* round about; set against a *Damaske Cushion*; Thrust into *Sand*; Into *Ashes*; Into *Water*, (halfe an *Inch* under the *Water*;) Close to the *Bottom* of a *Silver Basin*; And still the *Tone* remained: But the *Bottom* of it was set against a *Woollen Carpet*; A *Lining* of *Plush*; A *Locke* of *Wooll*, (though loosely put in;) Against *Snow*; And the *Sound* of it was quite deaded, and but *Breath*.

160 Iron Hot produceth not so full a *Sound*, as when it is Cold; For while it is hot, it appeareth to be more Soft, and lesse *Resounding*. So likewise *Warne Water*, when it falleth, maketh not so full a *Sound*, as Cold: And I conceive it is softer, and neerer the Nature of *Oyle*; For it is more slippery; As may be perceived, in that it scowreth better.

161 Let there be a *Recorder* made, with two *Fipples*, at each end one; The

Truncke of it of the length of two *Recorders*, and the Holes answerable towards each end; And let two play the same Lesson upon it, at an Union; And let it be noted, whether the *Sound* be confounded; or amplified; or dulled. So likewise let a *Crosse* be made, of two Trunkes (thorow-out) hollow; And let two speake, or sing, the one long wayes, the other traverse: And let two heare at the opposite Ends; And note, whether the *Sound* be confounded; amplified; or dulled. Which two *Instances* will also give light to the *Mixture of Sounds*; whereof we shall speake hereafter.

A *Bellows* blowne in at the *Hole* of a *Drum*, and the *Drum* then stricken, maketh the *Sound* a little flatter, but no other apparent Alteration. The *Cause* is manifest; Partly for that it hindreth the Issue of the *Sound*; And partly for that it maketh the *Aire*, being blowne together, lesse moveable.

The *Loudnesse*, and *Softnesse* of *Sounds*, is a Thing distinct from the *Magnitude* and *Exilitie* of *Sounds*; For a *Base String*, though softly stricken, giveth the greater *Sound*; But a *Treble String*, if hard stricken, will be heard much further off. And the *Cause* is, for that the *Base String* striketh more *Aire*; And the *Treble* lesse *Aire*, but with a sharper *Percussion*.

It is therefore the *Strength* of the *Percussion*, that is a Principall Cause of the *Loudnesse* or *Softnesse* of *Sounds*: As in knocking harder or softer; Winding of a *Horne* stronger or weaker; Ringing of a *Hand-bell* harder or softer &c. And the *Strength* of this *Percussion*, consisteth, as much, or more, in the *Hardnesse* of the *Body Percussed*, as in the *Force* of the *Body Percussing*: For if you strike against a *Cloth*, it will give a lesse *Sound*; If against *Wood*, a greater; If against *Metall*, yet a greater; And in *Metals*, if you strike against *Gold*, (which is the more pliant,) it giveth the flatter *Sound*; If against *Silver*, or *Brasse*, the more Ringing *Sound*. As for *Aire*, where it is strongly pent, it matcheth a *Hard Body*. And therefore we see in discharging of a *Pece*, what a great *Noise* it maketh. We see also, that the *Charge* with *Bullet*; Or with *Paper* wet, and hard stopped; Or with *Powder* alone, rammed in hard, maketh no great difference in the *Loudnesse* of the *Report*.

The *Sharpnesse* or *Quicknesse* of the *Percussion*, is a great Cause of the *Loudnesse*, as well as the *Strength*: As in a *Whip*, or *Wand*, if you strike the *Aire* with it; the Sharper & Quicker you strike it, the Louder *Sound* it giveth. And in playing upon the *Lute*, or *Virginalls*, the quicke Stroke or Touch, is a great life to the *Sound*. The *Cause* is, for that the Quicke Striking curteth the *Aire* speedily; whereas the Soft Striking, doth rather beat, than cut.

The *Communication* of *Sounds* (as in *Bellies* of *Lutes*, *Empty Vessells*, &c.) hath been touched obiter, in the *Majoration* of *Sounds*: But it is fit also to make a *Title* of it apart.

The

Experiments
in Consort
touching the
Loudnesse or
Softnesse of
Sounds; and
their Carriage
at longer or
shorter Di-
stance.

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165

Experiments
in Consort
touching the
Communication
of *Sounds*.

166

The Experiment for greatest Demonstration of Communication of Sounds, is the Chiming of Bells; where if you strike with a Hammer upon the Vpper Part, and then upon the Midst, and then upon the Lower, you shall finde the Sound to be more Treble, and more Base, according unto the Concave, on the Inside; though the Percussion be onely on the Outside.

167

When the Sound is created betweene the Blast of the Mouth, and the Aire of the Pipe, it hath neverthelesse some Communication with the Matter of the Sides of the Pipe, and the Spirits in them contained; for in a Pipe, or Trumpet, of Wood, and Brasse, the Sound will be divers; So if the Pipe be covered with Cloth, or Silke, it will give a divers sound, from that it would doe of it selfe; So, if the Pipe be a little wet on the In-side, it will make a differing Sound, from the same Pipe dry.

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That Sound made within water, doth communicate better with a hard Body thorow water, than made in Aire, it doth with Aire; Vide Experimentum, 134.

Experiments
in Colours touch-
ing Equality,
and Inequality
of Sounds.

We have spoken before (in the Inquisition touching Musicke,) of Muscicall Sounds, whereunto there may be a Concord or Discord in two Parts; Which Sounds we call Tones; And likewise of Immuscicall Sounds; And have given the Cause, that the Tone proceedeth of Equalitie, and the other of Inequalitie. And we have also expressed there, what are the Equall Bodies that give Tones, and what are the Vnequall that give none. But how we shall speake of such Inequalitie of Sounds, as proceedeth, not from the Nature of the Bodies themselves, but is Accidentall; Either from the Roughnesse, or Obliquitie of the Passage; or from the Doubling of the Percutient; Or from the Trepidation of the Motion.

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A Bell, if it have a Rift in it, whereby the Sound hath not a cleare Passage, giveth a Hoarse and Iarring Sound; So the Voice of Man, when by Cold taken the Wesill groweth rugged, and (as wee call it) furred, becommeth hoarse. And in these two Instances, the Sounds are Ingrate; because they are meere Vnequall: But, if they be Vnequall in Equalitie, then the Sound is Gratefull, but Purling.

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All Instruments, that have either Returnes, as Trumpets; Or Flexions, as Cornets; Or are Drawne up, and put from, as Sackbuts; have a Purling Sound: But the Recorder, or Flute, that have none of these Inequalities, give a cleare sound. Neverthelesse, the Recorder it selfe, or Pipe moistened a little in the Inside, soundeth more solemnly, and with a little Purling, or Hissing. Againe, a Wreathed String, such as are in the Base Strings of Bandoraes, giveth also a Purling Sound.

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But a Lute-string, if it be meere Vnequall in his Parts, giveth a Harsh and

and Untuneable sounds; which Strings we call False, being bigger in one Place than in another; And therefore Wire-strings are never False. Wee see also, that when we try a False Lute-string, wee use to extend it hard betweene the fingers, and to fillip it; And if it giveth a double Species, it is True; But if it giveth a treble, or more, it is False.

Waters, in the Noise they make as they runne, represent to the Eare a Trembling Noise; And in Regalls, (where they have a Pipe, they call the Nightingale-Pipe, which containeth Water) the Sound hath a continuall Trembling: And Children have also little Things they call Cocks, which have Water in them; And when they blow, or whistle in them, they yee'd a Trembling Noise; Which Trembling of Water, hath an affinity with the Letter L. All which Inequalities of Trepidation, are rather pleasant, than otherwise.

All Base Notes, or very Treble Notes, give an Asper Sound; For that the Base striketh more Aire, than it can well strike equally: And the Treble cutteth the Aire so sharpe, as it returneth too swift, to make the Sound Equall: And therefore a Meane, or Tenor, is the sweetest Part.

We know Nothing, that can at pleasure make a Muscull, or Immuscull Sound, by voluntary Motion, but the Voice of Man, and Birds. The Cause is, (no doubt) in the Weasill or Wind pipe, (which we call Aspera Arteria,) which being well extended, gathereth Equalitie; As a Bladder that is wrinckled, if it be extended, becommeth smooth. The Extension is alwayes more in Tones, than in Speech: Therefore the Inward Voice or Whisper can never give a Tone: And in Singing, there is (manifestly) a greater Working and Labour of the Throat, than in Speaking; As appeareth in the Thrusting out, or Drawing in of the Chinne, when we sing.

The Humming of Bees, is an Unequall Buzzing; And is conceived, by some of the Ancients, not to come forth at their Mouth, but to be an Inward Sound; But (it may be) it is neither; But from the motion of their Wings; For it is not heard but when they stirre.

All Metals quenched in Water, give a Sibilation or Hissing Sound; (which hath an Affinitie with the letter Z.) notwithstanding the sound be created betweene the Water or Vapour, and the Aire. Seeing also, if there be but small Store of Water, in a Vessell, giveth a Hissing Sound; But Boiling in a full Vessell, giveth a Bubbling Sound, drawing somewhat neare to the Cocks used by Children.

Triall would be made, whether the Inequalitie, or Interchange of the Medium, will not produce an Inequalitie of Sound; As if three Bells were made one within another, and Aire berwixt Each; And then the outermost Bell were chimed with a Hammer, how the Sound would differ from a Simple Bell. So likewise take a Plate of Brasse, and a Plancke of Wood, and joyne them close together, and knock upon one of them, and see if they doe not give an unequall Sound. So make two or three Partitions of Wood in a Hogshead, with Holes or Knobs in them; And marke the difference of their Sound, from the Sound of an Hogshead, without such Partitions.

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It

Experiments
in Consort,
touching the
more Treble, and
the more Base
Tones, or Musi-
call Sounds.

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It is evident, that the Percussion of the Greater Quantitie of Aire, causeth the Baser Sound; And the lesse Quantitie, the more Treble Sound. The Percussion of the Greater Quantitie of Aire, is produced by the Greatnesse of the Body Percussing; By the Latitude of the Concave, by which the Sound passeth; and by the Longitude of the same Concave. Therefore wee see that a Base string, is greater than a Treble; A Base Pipe hath a greater Bore than a Treble; And in Pipes, and the like, the lower the Note Holes be, and the further off from the Mouth of the Pipe, the more Base Sound they yeeld; And the nearer the Mouth, the more Treble. Nay more, if you strike an Entire Body, as an Andiron of Brasse, at the Top, it maketh a more Treble Sound; And at the Bottome a Baser.

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It is also evident, that the Sharper or Quicker Percussion of Aire causeth the more Treble Sound; And the Slower or Heavier, the more Base Sound. So we see in Strings; the more they are wound up, and strained; (And thereby give a more quicke Start-backe;) the more Treble is the Sound; And the slacker they are, or lesse wound up, the Baser is the Sound. And therefore a Bigger String more strained, and a Lesser String, lesse strained, may fall into the same Tone.

180

Children, Women, Eunuchs have more small and shrill Voices, than Men. The Reason is, not for that Men have greater Heat, which may make the Voice stronger, (for the strength of a Voice or Sound, doth make a difference in the Loudnesse or Softnesse, but not in the Tone;) But from the Dilatation of the Organ; which (it is true) is likewise caused by Heat. But the Cause of Changing the Voice, at the yeares of Pubertie, is more obscure. It seemeth to be, for that when much of the Moisture of the Body, which did before irrigate the Parts, is drawne downe to the Spermaticall vessels, it leaveth the Body more hot than it was; whence cometh the Dilatation of the Pipes: For we see plainly, all Effects of Heat, doe then come on; As Pilositie, more Roughnesse of the Skinne, Hardnesse of the Flesh, &c.

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The Industry of the Musitian, hath produced two other Meanes of Straining, or Intension of Strings, besides their Winding up. The one is the Stopping of the String with the Finger; As in the Necks of Lutes, Viols, &c. The other is the Shortnesse of the String; As in Harps, Virginalls, &c. Both these have one, and the same reason; For they cause the String to give a quicker Start.

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In the Straining of a String, the further it is strained, the lesse Superstraining goeth to a Note; For it requireth good Winding of a String, before it will make any Note at all: And in the Stop of Lutes, &c. the higher they goe, the lesse Distance is betweene the Frets.

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If you fill a Drinking Glasse with Water, (especially one Sharp below, and Wide above,) and fillip upon the Brim, or Outside; And after empty Part of the Water, and so more and more, and still try the Tone by Filipping; you shall finde the Tone fall, and be more Base, as the Glasse is more Emptie.

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The Just and Measured Proportion of the *Aire Percussed*, towards the *Basenesse* or *Treblenesse* of *Tones*, is one of the greatest Secrets in the Contemplation of *Sounds*. For it discovereth the true *Coincidence* of *Tones* into *Diapasons*; Which is the Returne of the same *Sound*. And so of the *Concords* and *Discords*, betweene the *Vnison*, and *Diapason*; Which we have touched before, in the *Experiments* of *Musicke*; but thinke fit to resume it here, as a principall Part of our Enquiry touching the *Nature* of *Sounds*. It may bee found out in the *Proportion* of the *Winding* of *Strings*; In the *Proportion* of the *Distance* of *Frets*; And in the *Proportion* of the *Concave* of *Pipes*, &c. But most commodiously in the last of these.

Try therefore the *Winding* of a *String* once about, as soone as it is brought to that *Extension*, as will give a *Tone*; And then of twice about; And thrice about, &c. And marke the *Scale* or *Difference* of the *Rise* of the *Tone*: Whereby you shall discover, in one, two Effects; Both the *Proportion* of the *Sound* towards the *Dimension* of the *winding*; And the *Proportion* likewise of the *Sound* towards the *String*, as it is more or lesse strained. But note that to measure this, the way will bee, to take the *Length* in a right *Line* of the *String*, upon any *Winding* about of the *Pegge*.

As for the *stops*, you are to take the *Number* of *Frets*; And principally the *Length* of the *Line*, from the first *Stope* of the *String*, unto such a *Stop* as shall produce a *Diapason* to the former *Stop*, upon the same *String*.

But it will best (as it is said) appeare, in the *Bores* of *Wind-Instruments*; And therefore cause some halfe dozen *Pipes*, to be made, in length, and all things else, alike, with a single, double, and so on to a sextuple *Bore*; And so marke what *Fall* of *Tone* every one giveth. But still in these three last *Instances*, you must diligently observe, what *length* of *String*, or *Distance* of *Stop*, or *Concave* of *Aire*, maketh what *Rise* of *Sound*. As in the last of these (which (as we said) is that, which giveth the aptest demonstration,) you must set downe what *Encrease* of *Concave* goeth to the Making of a *Note* higher; And what of two *Notes*; And what of three *Notes*, And so up to the *Diapason*: For then the great Secret of *Numbers*, and *Proportions*, will appeare. It is not unlike, that those that make *Recorders*, &c. know this already: for that they make them in *Sets*. And likewise *Bell-founders* in fitting the tune of their *Bells*. So that Enquiry may save *Triall*. Surely, it hath beene observed by one of the *Ancients*, that an *Empty Barrell* knocked upon with the finger, giveth a *Diapason* to the *Sound* of the like *Barrell full*; But how that should be, I doe not well understand; For that the knocking of a *Barrell full*, or *Empty*, doth scarce give any *Tone*.

Experiments
in Confort
touching the
Proportion of
Treble and Base
Tones.

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not
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Experiments
in Confort touch-
ing Exteri-
our, and Interi-
our Sounds.

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Experiments
in Confort,
touching Arti-
culation of
Sounds.

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There is required some sensible Difference in the Proportion of creating a Note, towards the Sound it selfe, which is the Passive: And that it bee not too neare, but at a distance. For in a Recorder, the three uppermost Holes, yeeld one Tone; which is a Note lower than the Tone of the first three. And the like (no doubt) is required in the Winding or Stopping of Strings.

There is another Difference of Sounds, which we will call *Exterieur*, and *Interiour*. It is not Soft, nor Loud: Nor it is not Base, nor Treble: Nor it is not Muscally, nor Immuscally: Though it be true, that there can be no Tone in an *Interiour Sound*: But on the other side, in an *Exterieur Sound*, there may bee both Muscally and Immuscally. We shall therefore enumerate them, rather than precisely distinguish them; Though (to make some Adumbration of that we meane) the *Interiour* is rather an Impulsion or Contusion of the Aire, than an Elision or Section of the same. So as the Percussion of the one, towards the other, differeth, as a Blow differeth from a Cut.

In Speech of Man, the *Whispering*, (which they call *Susurrus* in Latine,) whether it be louder or softer, is an *Interiour Sound*; But the *Speaking out*, is an *Exterieur Sound*; And therefore you can never make a Tone, nor sing in *whispering*; But in Speech you may: So *Breathing*, or *Blowing* by the Mouth, Bellows, or Wind, (though loud) is an *Interiour Sound*; But the *Blowing* thorow a Pipe, or Concave, (though soft) is an *Exterieur*. So likewise, the greatest Winds, if they have no Coarctation, or blow not hollow, give an *Interiour Sound*; The Whistling or hollow Wind yeeldeth a Singing, or *Exterieur Sound*; The former being pent by some other Body; The latter being pent in by his owne Density: And therefore we see, that when the Wind bloweth hollow, it is a Signe of Raine. The Flame, as it moveth within it selfe, or is blowne by a Bellows, giveth a Murmur or *Interiour Sound*.

There is no Hard Body, but stricke against another Hard Body, will yeeld an *Exterieur Sound*, greater or lesser: In so much as if the Percussion be over-soft, it may induce a Nullity of Sound; But never an *Interiour Sound*; As when one treadeth so softly, that hee is not heard.

Where the Aire is the Percutient, pent, or not pent, against a Hard Body, it never giveth an *Exterieur Sound*; As if you blow strongly with a Bellows against a Wall.

Sounds (both *Exterieur* and *Interiour*,) may be made, as well by Section, as by Emission of the Breath: As in Whistling, or Breathing.

It is evident, and it is one of the strangest Secrets in Sounds, that the whole Sound is not in the whole Aire only; But the whole Sound is also in every small Part of the Aire. So that all the curious Diversity of Articulate

Articulate Sounds, of the Voice of Man, or Birds, will enter at a small Cranny, Inconfused.

The *Unequal Agitation* of the winds, and the like, though they bee materiall to the Carriage of the *Sounds*, further, or lesse way; yet they doe not confound the *Articulation* of them at all, within that distance that they can be heard; Though it may be, they make them to be heard lesse Way, than in a Still; as hath beene partly touched.

Over-great Distance confoundeth the *Articulation* of *Sounds*; As we see; that you may heare the *Sound* of a Preachers voice, or the like, when you cannot distinguish what he saith. And one *Articulate Sound* will confound another; As when many speake at once.

In the *Experiment* of *Speaking under water*, when the Voice is reduced to such an Extreame Exility, yet the *Articulate Sounds*, (which are the *Words*) are not confounded; as hath beene said.

I conceive, that an *Extreme Small*, or an *Extreme Great Sound*, cannot be *Articulate*; But that the *Articulation* requireth a *Mediocrity* of *Sound*: For that the *Extreme Small Sound* confoundeth the *Articulation* by *Contracting*; And the *Great Sound*, by *Dispersing*: And although (as was formerly said) a *Sound Articulate*, already created, will bee contracted into a small Cranny; yet the first *Articulation* requireth more Dimension.

It hath beene observed, that in a *Roome*, or in a *Chappell*, Vaulted below, and Vaulted likewise in the Roofe, a Preacher cannot be heard so well, as in the like Places not so Vaulted. The Cause is, for that the *Subsequent Words* come on, before the *Precedent words* vanish: And therefore the *Articulate Sounds* are more confused, though the Grosse of the *Sound* be greater.

The *Motions* of the *Tongue*, *Lips*, *Throat*, *Pallat*, &c. which goe to the *Making* of the severall *Alphabetical Letters*, are worthy Enquiry, and pertinent to the present *Inquisition* of *Sounds*: But because they are subtile, and long to describe, wee will refer them over, and place them amongst the *Experiments* of *Speech*. The *Hebrewes* have beene diligent in it, and have assigned, which *Letters* are *Labiall*, which *Dental*, which *Gutturall* &c. As for the *Latines*, and *Grecians*, they have distinguished betweene *Semi-vowels*, and *Mutes*; And in *Mutes*, betweene *Muta Tenuis*, *Media*, and *Aspirata*; Not amisse; But yet not diligently enough. For the speciall *Stroakes*, & *Motions*, that create those *Sounds*, they have little enquired: As that the *Letters*, *B. P. F. M.* are not expressed, but with the *Contracting*, or *Shutting* of the *Mouth*; That the *Letters* *N.* and *B.* cannot bee pronounced, but that the *Letter* *N.* will turne into *M.* As *Hecatonba*, will be *Hecatomba*. That *M.* and *T.* cannot be pronounced together; but *P.* will come betweene; as *Emtus*, is pronounced *Emptus*; And a Number of the like. So that if you enquire to the full; you will finde, that to the *Making* of the whole *Alphabet*, there will be fewer *Simple Motions* required, than there are *Letters*.

The *Lungs* are the most Spongy Part of the Body; And therefore ablest to contract, and dilate it selfe; And where it contracteth it selfe,

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it expelleth the *Aire*; which thorow the *Artire*, *Throat*, and *Mouth*, maketh the *Voice*: But yet *Articulation* is not made, but with the helpe of the *Tongue*, *Palate*, and the rest of those they call *Instruments of voice*.

There is found a Similitude, betweene the *Sound* that is made by *Inanimate Bodies*, or by *Animate Bodies*, that have no *Voice Articulate*; and divers *Letters of Articulate Voices*: And commonly Men have given such Names to those *Sounds*, as doe allude unto the *Articulate Letters*. As *Trembling of water* hath Resemblance with the *Letter L*; *Quenching of Hot Mettalls*, with the *Letter Z*; *Snarling of Dogs*, with the *Letter R*; The *Noise of Scritchowles*, with the *Letter Sh*; *Voice of Cats*, with the *Dyphthong Eu*; *Voice of Cuckoes*, with the *Dyphthong Ou*; *Sounds of Strings*, with the *Letter Ng*: So that if a Man, (for Curiosity, or Strangenesse sake,) would make a *Puppet* or other *Dead Body*, to pronounce a *Word*; Let him consider, on the one Part, the *Motion of the Instruments of Voice*; and on the other part the like *Sounds made in Inanimate Bodies*; And what Conformity there is that causeth the Similitude of *Sounds*; And by that he may minister light to that Effect.



NATV-

NATVRALL HISTORIE.

III. Century.



ALL Sounds (whatsoever) move Round; That is to say; On all Sides; Vpwards; Downwards; Forwards; and Backwards. This appeareth in all Instances.

Sounds do not require to be conveyed to the Sense, in a Right Line, as Visibles doe, but may bee Arched; Though it bee true, they move strongest in a Right Line; Which neverthelesse is not caused by the Rightnesse of the Line, but by the Shortnesse of the distance; *Linea recta brevissima*. And therefore wee see, if a wall be betweene, and you speake on the one Side, you heare it on the other; Which is not because the sound Passeth thorow the wall; but Archeth over the wall.

If the sound be Stopped and Repercussed, it commeth about on the other Side, in an Oblique Line. So, if in a Coach, one side of the Boot be downe, and the other up; And a Begger beg on the Close Side; you would thinke that hee were on the Open Side. So likewise, if a Bell or Clocke, bee (for Example) on the North-side of a Chamber; And the Window of that Chamber be upon the South; He that is in the Chamber will thinke the Sound came from the South.

Sounds, though they spread round, (so that there is an Orbe, or Spherical Area of the Sound;) yet they move strongest, and goe furthest in the Fore-lines, from the first Locall Impulsion of the Aire. And therefore in Preaching, you shall heare the Preachers Voice, better, before the Pulpit, than behinde it, or on the Sides, though it stand open. So a Harquebuz, or Ordinance, will bee further heard, forwards, from the Mouth of the Peece, than backwards, or on the Sides.

It may bee doubted, that sounds doe move better, Downwards than

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Experiments
in Consort
touching the
Motions of
Sounds, in what
Lines they are
Circular, Ob-
lique, Straight;
Vpwards,
downwards;
Forwards,
Backwards.

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than Upwards. *Palpits* are placed high above the People. And when the Ancient *Generalls* spake to their Armies, they had ever a Mount of Turfe cast up, whereupon they stood: But this may bee imputed to the Stops and Obstacles, which the voice meeteth with, when one speaketh upon the levell. But there seemeth to be more in it: For it may be, that *Spirituall Spices*, both of *Things Visible* and *Sounds*, doe move better Downwards than Upwards. It is a strange Thing, that to Men standing below on the Ground, those that be on the Top of Pauls, seeme much lesse than they are, and cannot bee knowne; But to Men above, those below seeme nothing so much lessened, and may bee knowne: yet it is true, that all things to them above, seeme also somewhat contracted, and better collected into Figure: as *Knots* in *Gardens* shew best from an Upper window, or Tarras.

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But to make an exact Triall of it, let a Man stand in a *Chamber*, not much above the Ground, and speake out at the windowe, thorough a *Trunke*, to one standing on the Ground, as softly as hee can, the other laying his Eare close to the *Trunke*: Then *viâ versa*, let the other speake below keeping the same Proportion of Softnesse; And let him in the *Chamber* lay his Eare to the *Trunck*: And this may bee the aptest Meanes, to make a Judgement, whether *Sounds* descend, or ascend, better.

Experiments
in Consort tou-
ching the Last-
ing and Peri-
shing of Sounds;
And touching
the Time they
require to
their Generati-
on, or Detraction.

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After that *sound* is created, (which is in a moment,) wee finde it contineth some smal time, melting by little and little. In this there is a wonderfull Errour amongst Men, who take this to be a *Continuance* of the First *Sound*; whereas (in truth) it is a *Renovation*, and not a *Continuance*: For the *Body percussed*, hath by reason of the *Percussion*, a *Trepidation* wrought in the *Minute Parts*; and so reneweth the *Percussion* of the *Aire*. This appeareth manifestly, because that the Melting *Sound* of a Bell, or of a String stricken, which is thought to bee a *Continuance*, ceaseth as soone as the Bell or String are touched. As in a *Virginall*, as soone as ever the Jacke falleth; and toucheth the String, the *Sound* ceaseth; And in a Bell, after you have chimed upon it, if you touch the Bell, the *Sound* ceaseth. And in this you must distinguish that there are two *Trepidations*: The one Manifest, and Locall; As of the Bell, when it is *Pensile*: The other Secret, of the *Minute Parts*; such as is described in the 9th Instance. But it is true, that the *Locall* helpeth the *Secret* greatly. We see likewise that in Pipes, and other winde Instruments, the *Sound* lasteth no longer, than the breath bloweth. It is true, that in *Organs*, there is a confused Murmur for a while; after you have played; But that is but while the Bellows are in Falling.

It is certaine, that in the Noise of great *Ordinance*, where many are shot off together, the *Sound* will bee carried, (at the least) twenty Miles upon the land, and much further upon the Water. But then it will come to the Eare; Not in the Instant of the Shooting off, but it will come an Houre, or mor later. This must needs be a *Continuance* of the First *Sound*; For there is no *Trepidation* which should renew it. And the

the Touching of the *Ordnance* would not extinguish the *Sound* the sooner : So that in great *Sounds* the *Continuance* is more than Momentary.

To try exactly the time wherein *Sound* is *Delated*, Let a Man stand in a Steeple, and have with him a Taper ; And let some Vaile be put before the Taper ; And let another Man stand in the Field a Mile off. Then let him in the Steeple strike the Bell ; And in the same Instant withdraw the Vaile ; And so let him in the Field tell by his Pulse what distance of *Time* there is, betwene the *Light* scene, and the *Sound* heard : For it is certaine that the *Delation* of *Light* is in an Instant. This may be tried in farre greater Distances, allowing greater *Lights* and *Sounds*.

It is generally knowne and observed, that *Light*, and the *Object* of *Sight*, move swifter than *Sound* ; For we see the *Flash* of a Peece is seene sooner, than the *Noise* is heard. And in Hewing wood, if one be some distance off, he shall see the Arme lifted up for a second Stroke. before he heare the *Noise* of the first. And the greater the Distance, the greater is the Prevention : As we see in Thunder, which is farre off ; where the *Lightning* Pecedeth the Cracke a good space.

Colours, when they represent themselves to the Eye, fade not, nor melt not by Degrees, but appeare still in the same Strength ; But *Sounds* melt, and vanish, by little and little. The Cause is, for that *Colours* participate nothing with the *Motion* of the *Aire* ; but *Sounds* doe. And it is a plaine Argument, that *Sound* participateth of some *Locall Motion*, of the *Aire*, (as a Cause *Sine qua non*.) in that, it perisheth so suddenly ; For in every Section, or Impulsion of the *Aire*, the *Aire* doth suddenly restore and reunite it selfe ; which the *Water* also doth, but nothing so swiftly.

In the Trialls of the *Passage*, or Not *Passage* of *Sounds*, you must take heed, you mistake not the *Passing By the sides* of a Body, for the *Passing thorow* a Body : And therefore you must make the *Intercepting* Body very close ; For *Sound* will passe thorow a small Chincke.

Where *Sound* passeth thorow a *Hard*, or *Close Body* (as thorow *Water* ; thorow a *Wall* ; thorow *Metall*, as in Hawkes Bells stopped ; &c.) the *Hard*, or *Close Body*, must be but thinne and small ; For else it deadeth and extinguisheth the *Sound* utterly. And therefore, in the *Experiment* of *Speaking in Aire under Water*, the Voice must not be very deepe within the *Water* : For then the *Sound* pierceth not. So if you speake on the further side of a *Close Wall*, if the *Wall* be very thicke, you shall not be heard : And if there were an Hoghead emptie, whereof the Sides were some two Foot thicke, and the Bung hole stopped ; I conceive the *Resounding Sound*, by the *Communication* of the *Outward Aire*, with the *Aire within*, would be little or none : But onely you shall heare the *Noise* of the Outward Knocke, as if the Vessell were full.

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It is certaine, that in the *Passage of Sounds* thorow *Hard Bodies*, the Spirit or Pneumaticall Part of the Hard body it selfe, doth cooperate; But much better, when the Sides of that *Hard Body* are stricke, than when the Percussion is onely within, without Touch of the Sides. Take therefore a Hawkes Bell, the holes stopped up, and hang it by a threed, within a Bottle Glasse; And stop the Mouth of the Glasse, very close with Wax; And then shake the Glasse, and see whether the Bell give any *sound* at all, or how weake? But note, that you must in stead of the Threed, take a Wire; Or else let the Glasse have a great Belly; lest when you shake the Bell, it dash upon the Sides of the Glasse.

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It is plaine, that a very *Long*, and *Downe-right Arch*, for the *sound* to passe, will extinguish the *sound* quite; So that that *sound*, which would be heard over a wall, will not be heard over a Church; Nor that *sound*, which will be heard, if you stand some distance from the wall, will be heard if you stand close under the wall.

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Soft and *Foraminous Bodies*, in the first Creation of the *sound*, will dead it; For the Striking against Cloth, or Furie, will make little *sound*; As hath beene said: But in the *Passage* of the *sound*, they will admit it better than *Harder Bodies*; As we see, that Curtaines, and Hangings, will not stay the *sound* much; But Glasse-windowes, if they be very Close, will checke a *sound* more, than the like Thickness of Cloth. Wee see also, in the Rumbling of the Belly, how easily the *sound* passeth thorow the Guts, and Skin.

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It is worthy the Enquiry, whether *Great Sounds*, (As of Ordnance, or Bells,) become not more *Weake*, and *Exile*, when they passe thorow *Small Crannies*. For the *Subtilties* of *Articulate Sounds*, (it may be,) may passe thorow *Small Crannies*, not confused; But the *Magnitude* of the *sound* (perhaps,) not so well.

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touching the
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THE Mediums of Sounds are *Aire*; *Soft* and *Porous Bodies*; Also *Water*. And *Hard Bodies* refuse not altogether to be Mediums of Sounds. But all of them are dull and unapt Deferents, except the *Aire*.

In *Aire*, the Thinner or Drier *Aire*, carrieth not the *sound* so well, as the more Dense; As appeareth in *Night Sounds*; And *Evening Sounds*; And *Sounds* in moist Weather, and Scutherne Winds. The reason is already mentioned in the Title of *Majoration of Sounds*; Being for that *Thinne Aire* is better pierced; but *Thicke Aire* preserveth the *sound* better from Wast; Let further Triall be made by Hollowing in Mists, and Gentle Showers: For (it may be) that will somewhat dead the *sound*.

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How farre forth *Flame* may be a Medium of Sounds, (especially of such Sounds as are created by *Aire*, and not betwixt *Hard Bodies*) let it be tryed, in *Speaking* where a Bonfire is betweene; But then you must allow, for some disturbance, the Noise that the *Flame* it selfe maketh.

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Whether any other *Liquours*, being made Mediums, cause a Diversity of *sound* from *Water*, it may be tryed: As by the Knapping of the Tongs; Or Striking of the Bottome of a vessell, filled either with Milke,

or

or with Oyle; which though they be more light, yet are they more un-equall Bodies than Aire.

Of the Natures of the Mediums, we have now spoken; As for the Disposition of the said Mediums, it doth consist in the Penning, or not Penning of the Aire; Of which we have spoken before, in the Title of Delation of Sounds: It consisteth also in the Figure of the Concave, through which it passeth; Of which we will speake next.

How the Figures of Pipes, or Concaves, through which Sounds passe; Or of other Bodies deferent; conduce to the Varietie and Alteration of the Sounds; Either in respect of the Greater Quantitie, or lesse Quantitie of Aire, which the Concaves receive; Or in respect of the Carrying of Sounds longer or shorter way; Or in respect of many other Circumstances; they have beene touched, as falling into other Titles. But those Figures, which we now are to speake of, wee intend to be, as they concerne the Lines, through which Sound passeth; As Straight; Crooked; Angular; Circular; &c.

The Figure of a Bell pertaketh of the Pyramis, but yet coming off, and dilating more suddenly. The Figure of a Hunters Horne, and Cornet, is oblique; yet they have likewise Straight Hornes; which if they be of the same Bore with the Oblique, differ little in sound; Save that the Straight require somewhat a stronger Blast. The Figures of Recorders, and Flutes, and Pipes are straight; But the Recorder hath a lesse Bore, and a greater; Above, and below. The Trumpet hath the Figure of the Letter S: which maketh that Purling sound, &c. Generally, the Straight Line hath the cleanest and roundest sound, And the Crooked the more Hoarse, and Jarring.

Of a Sinuous Pipe, that may have some foure Flexions, Triall would be made. Likewise of a Pipe, made like a Crosse, open in the midst. And so likewise of an Angular Pipe: And see what will be the Effects of these severall sounds. And so againe of a Circular Pipe; As if you take a Pipe perfect Round, and make a Hole whereinto you shall blow; And another Hole not farre from that; But with a Traverse or Stop between them; So that your Breath may goe the Round of the Circle, and come forth at the second Hole. You may trie likewise Percussions of Solide Bodies of severall Figures; As Globes, Flats, Cubes, Crosses, Triangles, &c. And their Combinations; As Flat against Flat; And Convex against Convex; And Convex against Flat, &c. And marke well the diversities of the Sounds. Trie also the difference in sound of severall Crassitudes of Hard Bodies percussed; And take knowledge of the diversities of the Sounds. I my selfe have tried, that a Bell of Gold yeeldeth an excellent sound, not inferiour to that of Silver, or Brasse, but rather better: yet wee see that a peece

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peece of Money of Gold soundeth farre more flat than a peece of Money of Silver.

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The Harpe hath the *Concave*, not along the *Strings*, but acrosse the *Strings*; And no *Instrument* hath the *Sound* so Melting, and Prolonged, as the *Irish Harpe*. So as I suppose, that if a *Virginal* were made with a double *Concave*; the one all the length as the *Virginal* hath; the other at the End of the *Strings*, as the *Harpe* hath; It must needs make the *Sound* perfecter, and not so Shallow, and Jarring. You may trie it, without any *Sound-Board* along, but onely *Harp-wise*, at one End of the *Strings*: Or lastly with a double *Concave*, at Each end of the *Strings* one.

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touching the
Mixture of
Sounds.

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There is an apparent Diversitie between the *Species Visible*, and *Audible*, in this; That the *Visible* doth not mingle in the *Medium*, but the *Audible* doth. For if we looke abroad, we see Heaven, a number of Stars; Trees, Hills, Men, Beasts, at once. And the *Species* of the one doth not confound the other. But if so many *Sounds* came from severall Parts, one of them would utterly confound the other. So wee see, that *Voices* or *Consorts* of *Musicke* doe make an *Harmony* by *Mixture*, which *Colours* doe not. It is true neverthelesse, that a great *Light* drowneth a smaller, that it cannot be seene; As the *Sunne* that of a *Gloworme*; as well as a Great *Sound* drowneth a lesser. And I suppose likewise, that if there were two *Lanthornes* of *Glasse*, the one a *Crimsin*, and the other an *Azure*, and a *Candle* within either of them, those *Coloured Lights* would mingle and cast vpon a *White Paper* a *Purple Colour*. And even in *Colours*, they yeeld a faint and weake *Mixture*: For white walls make *Roomes* more lightsome than blacke, &c. But the Cause of the *Confusion* in *Sounds*, and the *Inconfusion* in *Species Visible*, is, For that the *Sight* worketh in *Right Lines*, and maketh severall *Cones*; And so there can be no *Coincidence* in the *Eye*, or *Visuall Point*: But *Sounds*, that move in *Oblique* and *Arcuate Lines*, must needs encounter, and disturbe the one the other.

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The sweetest and best *Harmony* is, when every *Part*, or *Instrument*, is not heard by it selfe, but a *Conflation* of them all; Which requireth to stand some distance off. Even as it is in the *Mixture* of *Peis fumes*; Or the Taking of the *Smells* of severall *Flowers* in the *Aire*.

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The *Disposition* of the *Aire*, in other *Qualities*, except it be joyned with *Sound*, hath no great *Operation* upon *Sounds*: For whether the *Aire* be lightsome or darke, hot or cold, quiet or stirring, (except it be with *Noise*) sweet-smelling, or stinking, or the like; it importeth not much; Some petty *Alteration* or difference it may make.

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But *Sounds* doe disturbe and alter the one the other: Sometimes the one drowning the other, and making it not heard; Sometimes the one Jarring and discording with the other, and making a *Confusion*; Sometimes the one Mingling and Compounding with the other, and making an *Harmony*.

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Two *Voices* of like lowdnesse, will not be heard, twice as farre, as one

of

of them alone; And two *Candles* of like light, will not make Things seeme twice as farre off, as one. The Cause is profound; But it seemeth that the *Impressions* from the *Objects* of the *Senses*, doe mingle respectively, every one with his kinde; But not in proportion, as is before demonstrated: And the reason may be, because the first *Impression*, which is from *Privative* to *Active*, (As from *Silence* to *Noise*, or from *Darknesse* to *Light*,) is a greater Degree, than from *Lesse Noise*, to *More Noise*, or from *Lesse Light*, to *More Light*. And the Reason of that againe may be; For that the *Aire*, after it hath received a Charge, doth not receive a Surcharge, or greater Charge, with like Appetite, as it doth the first Charge. As for the Encrease of Vertue, generally, what Proportion it beareth to the Encrease of the Matter, it is a large Field, and to be handled by it selfe.

ALL *Reflexions* Concurrent doe make *Sounds* Greater; But if the Body that createth, either, the Originall *Sound*, or the *Reflexion*, be cleane and smooth, it maketh them Sweeter. Triall may be made of a *Lute*, or *Violl*, with the Belly of polished *Brasse*, in stead of *Wood*. Wee see that even in the Open *Aire*, the *wire String* is sweeter, than the *String* of *Guts*. And wee see that for *Reflexion*, *Water* excelleth; As in *Musicke* neare the *water*; Or in *Eccho's*.

It hath beene tried, that a *Pipe* a little moistned on the inside, but yet so as there be no Drops left, maketh a more solemne *sound*, than if the *Pipe* were dry: But yet with a sweet Degree of *Sibilation*, or *Purling*; As we touched it before in the title of *Equalitie*. The Cause is, for that all Things Porous, being superficially wet, and (as it were) betweene dry and wet, become a little more Even and Smooth; But the *Purling*, (which must needs proceed of *Inequalitie*,) I take to be bred between the Smoothnesse of the inward Surface of the *Pipe*, which is wet; And the Rest of the *Wood* of the *Pipe*, unto which the *Wet* cometh not, but it remaineth dry.

In *Frosty* weather, *Musicke* within doores soundeth better. Which may be, by reason, not of the Disposition of the *Aire*, but of the *Wood* or *String* of the *Instrument*, which is made more Crispe, and so more porous and hollow: And we see that *Old Lutes* sound better than *New*, for the same reason. And so doe *Lute-strings* that have beene kept long.

Sound is likewise *Meliorated* by the Mingling of Open *Aire* with *Pent Aire*; Therefore Triall may be made, of a *Lute* or *Violl* with a double Belly; Making another Belly with a Knot over the Strings; yet so, as there be Roome enough for the Strings, and Roome enough to play below that Belly. Triall may be made also of an *Irish Harpe*, with a Concave on both Sides; Whereas it useth to have it but on one Side. The doubt may be, lest it should make too much *Resounding*; whereby one Note would overtake another.

If you sing into the Hole of a *Drum*, it maketh the *singing* more sweet.

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sweet. And so I conceive it would, if it were a *Song* in Parts, sung into severall *Drums*; And for handsonnesse and strangeness sake, it would not be amisse to have a Curtaine betweene the Place where the *Drums* are, and the *Hearers*.

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When a *Sound* is created in a *wind-Instrument*, betweene the *Breath* and the *Aire*, yet if the *Sound* be communicate with a more equall Body of the *Pipe*, it meliorateth the *Sound*. For (no doubt) there would be a differing *Sound* in a *Trumpet*, or *Pipe of Wood*; And againe in a *Trumpet* or *Pipe of Brasse*. It were good to try *Recorders* and *Hunters Hornes* of *Brasse*, what the *Sound* would be.

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Sounds are meliorated by the *Intension* of the *Sense*, where the *Common Sense* is collected most, to the *particular Sense* of *Hearing*, and the *Sight* suspended: And therefore, *Sounds* are sweeter, (as well as greater,) in the *Night*, than in the *Day*; And I suppose, they are sweeter to blind Men, than to Others: And it is manifest, that betweene *Sleeping* and *Waking*, (when all the *Senses* are bound and suspended) *Musick* is farre sweeter, than when one is fully *Waking*.

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Sounds.

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IT is a Thing strange in Nature, when it is attentively considered; How *Children*, and some *Birds*, learne to imitate *Speech*. They take no Marke (at all) of the *Motion* of the *Mouth* of Him that speaketh; For *Birds* are as well taught in the Darke, as by Light. The *Sounds* of *Speech* are very Curious and Exquisite: So one would thinke it were a Lesson hard to learne. It is true, that it is done with time, and by little and little, and with many Essayes and Proffers: But all this dischargeth not the Wonder. It would make a Man thinke (though this which wee shall say may seeme exceeding strange) that there is some *Transmission* of *Spirits*; and that the *Spirits* of the *Teacher* put in Motion, should worke with the *Spirits* of the *Learner*, a Pre-disposition to offer to *Imitate*; And so to perfect the *Imitation* by degrees. But touching *Operations* by *Transmissions* of *Spirits*, (which is one of the highest Secrets in Nature,) wee shall speake in due place; Chiefly when wee come to enquire of *Imagination*. But as for *Imitation*, it is certaine, that there is in Men, and other Creatures, a pre-disposition to *Imitate*. We see how ready Apes and Monkeys are, to imitate all *Motions* of Man: And in the Catching of Dottrells, we see, how the Foolish Bird playeth the Ape in Gestures: And no Man (in effect) doth accompany with others, but he learneth, (ere he is aware,) some Gesture, or Voice, or Fashion of the other.

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In *Imitation* of *Sounds*, that Man should be the *Teacher*, is no Part of the Matter; For *Birds* will learne one of another; And there is no Reward, by feeding, or the like, given them for the *Imitation*; And besides, you shall have Parrots, that will not onely imitate Voices, but Laughing, Knocking, Squeaking of a Doore upon the Hinges, or of a Cart-wheele; And (in effect) any other Noise they heare.

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No *Beast* can imitate the *Speech* of Man, but *Birds* onely; For the Ape
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it selfe, that is so ready to *imitate* otherwise, attaineth not any degree of *Imitation* of Speech. It is true, that I have knowne a Dog, that if one howled in his Eare, he would fall a howling a great while. What should be the Aptnesse of *Birds*, in comparison of *Beasts*, to *imitate* the Speech of *Man*, may be further enquired. Wee see that *Beasts* have those Parts, which they count the *Instruments* of Speech, (as *Lips*, *Teeth*, &c.) liker unto *Man*, than *Birds*. As for the *Necke*, by which the *Throat* passeth; we see many *Beasts* have it, for the Length, as much as *Birds*. What better *Gorge*, or *Artire*, *Birds* have, may be further enquired. The *Birds* that are knowne to be *Speakers*, are, *Parrats*, *Pyes*, *Iayes*, *Dawes*, and *Ravens*. Of which *Parrots* have an adunque *Bill*, but the rest not.

But I conceive, that the Aptnesse of *Birds*, is not so much in the *Conformitie* of the *Organs* of Speech, as in their *Attention*. For Speech must come by *Hearing*, and *Learning*; And *Birds* give more heed, and marke *Sounds*, more than *Beasts*; Because naturally they are more delighted with them, and practise them more; As appeareth in their *Singing*. We see also, that those that teach *Birds* to sing, doe keepe them Waking, to increase their *Attention*. We see also, that *Cock-Birds*, amongst *Singing-Birds*, are ever the better *Singers*; which may be, because they are more lively, and listen more.

Labour, and *Intention* to *imitate* voices, doth conduce much to *Imitation*: And therefore we see, that there be certaine *Pantomimi*, that will represent the voices of *Players* of *Enterludes*, so to life, as if you see them not, you would thinke they were those *Players* themselves; And so the *Voices* of other *Men* that they heare.

There have beene some, that could counterfeit the *Distance* of *Voices*, (which is a *Secondary Object* of *Hearing*,) in such sort; As when they stand fast by you, you would thinke the Speech came from a farre off, in a fearefull manner. How this is done, may be further enquired. But I see no great use of it, but for *Imposture*, in counterfeiting *Ghosts* or *Spirits*.

There be three Kindes of *Reflexions* of *Sounds*, A *Reflexion* *Concurrent*; A *Reflexion* *Iterant*, which we call *Eccho*; And a *Super-reflexion*, or an *Eccho* of an *Eccho*, whereof the first hath beene handled in the *Title* of *Magnitude* of *Sounds*: The Latter two we will now speake of.

The *Reflexion* of *Species Visible*, by *Merrours*, you may command; Because passing in *Right Lines*, they may be guided to any *Point*: But the *Reflexion* of *Sounds* is hard to master; Because the *Sound* filling great *Spaces* in *Arched Lines*, cannot be so guided: And therefore we see there hath not beene practised, any *Meanes*, to make *Artificiall Eccho's*. And no *Eccho* already knowne returneth in a very narrow *Roome*.

The *Naturall Eccho's* are made upon *Walls*, *Woods*, *Rockes*, *Hills*, and *Banckes*; As for *Waters*, being neare, they make a *Concurrent Eccho*; But
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being further off, (as upon a large *River*) they make an *Iterant Eccho*: For there is no difference between the *Concurrent Eccho*, and the *Iterant*, but the *Quicknesse*, or *Slownesse* of the *Returne*. But there is no doubt, but *Water* doth helpe the *Delation* of *Eccho*; as well as it helpeth the *Delation* of *Originall Sounds*.

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It is certaine, (as hath beene formerly touched,) that if you speake thorow a *Trunke*, stopped at the further end, you shall finde a *Blast* returne upon your Mouth, but no *Sound* at all. The *Cause* is, for that the *Closenesse*, which preserveth the *Originall*, is not able to preserve the *Reflected Sound*: Besides that *Eccho's* are seldom created, but by loud *Sounds*. And therefore there is lesse hope of *Artificiall Eccho's* in *Aire*, pent in a narrow *Concave*. Neverthelesse it hath beene tried, that One leaning over a *Well*, of 25. Fathome deepe, and speaking, though but softly, (yet not so soft as a whisper,) the *water* returned a good *Audible Eccho*. It would be tried, whether Speaking in *Caves*, where there is no Issue, save where you speake, will not yeeld *Eccho's*, as *Wells* doe.

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The *Eccho* commeth as the *Originall Sound* doth, in a Round Orbe of *Aire*: It were good to try the *Creating* of the *Eccho*, where the *Body Repercussing* maketh an *Angle*: As against the *Returne* of a *Wall*, &c. Also we see that in *Mirrours*, there is the like *Angle* of *Incidence*, from the *Object* to the *Glasse*, and from the *Glasse* to the *Eye*. And if you strike a *Ball* side-long, not full upon the *Surface*, the *Rebound* will be as much the contrary way; Whether there bee any such *Resilience* in *Eccho's*, (that is, whether a *Man* shall heare better, if he stand aside the *Body Repercussing*, than if he stand where he speaketh, or any where in a right *Line* betweene;) may be tried. Triall likewise would be made, by Standing nearer the *Place* of *Repercussing*, than he that speaketh; And againe by Standing further off, than hee that speaketh; And so knowledge would be taken, whether *Eccho's*, as well as *Originall Sounds*, be not strongest neare hand.

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There be many *Places*, where you shall heare a number of *Eccho's*, one after another: And it is, when there is *Variety* of *Hills*, or *Woods*, some nearer, some further off: So that the *Returne* from the further, being last created, will be likewise last heard.

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As the *Voice* goeth round, as well towards the *Backe*, as towards the *Front* of him that speaketh; So likewise doth the *Eccho*; For you have many *Back-Eccho's* to the *Place* where you stand.

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To make an *Eccho*, that will report, three, or foure, or five *Words*, distinctly, it is requisite, that the *Body Repercussing*, be a good distance off: For if it be neare, and yet not so neare, as to make a *Concurrent Eccho*, it choppeth with you upon the sudden. It is requisite likewise, that the *Aire* be not much pent. For *Aire*, at a great distance, pent, worketh the same effect with *Aire*, at large, in a small distance. And therefore in the *Trial* of speaking in the *well*, though the *well* was deepe, the *Voice* came backe, suddenly; And would beare the *Report* but of two *Words*.

For

For *Eccho* upon *Eccho's*, there is a rare Instance thereof in a Place, which I will now exactly describe. It is some three or foure Miles from *Paris*, neere a Towne called *Pont-Charenton*; And some Bird-bolt shot, or more, from the River of *Seane*. The Roome is a *Chappell*, or small *Church*. The Walls all standing, both at the Sides, and at the Ends: Two Rowes of Pillars, after the manner of *Isles of Churches*, also standing; The Roofe all open, not so much as any Embowment neere any of the walls left. There was against every Pillar, a Stacke of Billers, above a Mans Height; which the Watermen, that bring Wood downe the *Seane*, in Stacks, and not in Boats, laid there (as it seemeth) for their ease. Speaking at the one End, I did heare it returne the Voice thirteene severall times; And I have heard of others, that it would returne sixteene times: For I was there about three of the Clocke in the afternoone: And it is best, (as all other *Eccho's* are) in the Evening. It is manifest, that it is not *Eccho's* from severall places, but a *Tossing* of the Voice, as a Ball, to and fro; Like to *Reflexions* in *Looking-glasses*; where if you place one *Glasse* before, and another behinde, you shall see the *Glasse* behinde with the *Image*, within the *Glasse* before; And againe, the *Glasse* before in that; and divers such *Super-Reflexions*, till the *species speciei* at last die. For it is every Returne weaker, and more shady. In like manner, the Voice in that *Chappell*, createth *speciem speciei*, and maketh succeeding *Super-Reflexions*; For it melteth by degrees, and every *Reflexion* is weaker than the former: So that, if you speake three Words, it will (perhaps) some three times report you the whole three Words; And then the two latter Words for some times; And then the last Word alone for some times; Still fading, and growing weaker. And whereas in *Eccho's* of one Returne, it is much to heare foure or five Words; In this *Eccho* of so many Returns, upon the matter, you heare above twenty Words, for three.

The like *Eccho* upon *Eccho*, but only with two Reports, hath beene observed to be, if you stand betweene a *House*, and a *Hill*, and lure towards the *Hill*. For the *House* will give a *Backe-Eccho*; One taking it from the other, and the latter the weaker.

There are certaine Letters, that an *Eccho* will hardly expresse; As *s*, for one; Especially being Principall in a Word. I remember well, that when I went to the *Eccho* at *Pont-Charenton*, there was an Old *Parisian*, that tooke it to be the Worke of Spirits, and of good Spirits. For, (said he) call *Satan*, and the *Eccho* will not deliver backe the Devils name; But will say, *Vat'en*; Which is as much in *French*, as *Apage*, or *Avoid*. And thereby I did hap to finde, that an *Eccho* would not returne *s*, being but a Hissing and an *Interiour Sound*.

Eccho's are some more sudden, and chop againe, as soone as the Voice is delivered; As hath beene partly said: Others are more deliberate, that is, give more Space betweene the Voice, and the *Eccho*; which is caused by the locall Nearenesse, or Distance: Some will report a longer Traine of Words; And some a shorter: Some more loud (full as loud as the Ori-

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ginall, and sometimes more loud;) And some weaker and fainter.

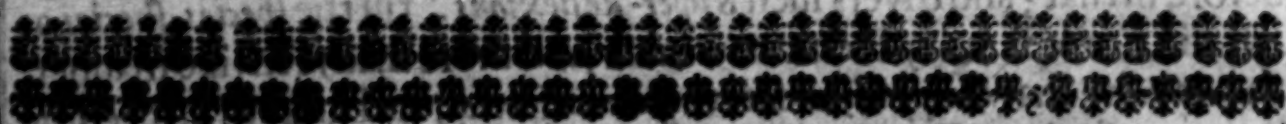
Where *Eccho's* come from severall Parts, at the same distance, they must needs make (as it were) a Quire of *Eccho's*, and so make the Report greater, and even a *Continued Eccho*; which you shall find in some *Hills*, that stand encompassed, Theater-like.

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It doth not yet appeare, that there is *Refraction* in *Sounds*, as well as in *Species Visible*. For I doe not thinke, that if a *Sound* should passe through divers *Mediums*, (as *Aire*, *Cloth*, *Wood*) it would deliver the *Sound*, in a differing Place, from that unto which it is deferred; which is the Proper Effect of *Refraction*. But *Majoration* which is also the Worke of *Refraction*, appeareth plainly in *Sounds*, (as hath beene handled at full;) But it is not by *Diversitie of Mediums*.

Experiments
in Confort,
touching the
Consent and
Dissent be-
tween *Visibles*
and *Audibles*.

Wee have *obiter*, for Demonstrations sake, used in divers *Instances*, the *Examples* of the *Sight*, and *Things Visible*, to illustrate the *Nature* of *Sounds*. But we thinke good now to prosecute that *Comparison* more fully.



CONSENT OF VISIBLES, and Audibles.

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Both of them spread themselves in Round, and fill a whole Floare or Orbe, unto certaine Limits: And are carried a great way: And doe languish and lessen by degrees, according to the Distance of the Objects from the Sensories.

256

Both of them have the whole *Species* in every small Portion of the *Aire*, or *Medium*, So as the *Species* doe passe through small Crannies, without Confusion: As we see ordinarily in *Levels*, as to the *Eye*; And in *Cran-nies*, or *Chinks*, as to the *Sound*.

257

Both of them are of a sudden and easie Generation and Delation; And likewise perish swiftly, and suddenly; As if you remove the *Light*; Or touch the *Bodies* that give the *Sound*.

258

Both of them doe receive and carry exquisite and accurate Differences; As of Colours, Figures, Motions, Distances, in *Visibles*; And of Articulate Voices, Tones, Songs, and Quaverings, in *Audibles*.

259

Both of them in their Vertue and Working, do not appeare to emit any Corporall Substance into their *Mediums*, or the Orbe of their Vertue; Neither againe to raise or stirre any evident locall Motion in their *Mediums*, as they passe; But only to carry certaine *Spiritual Species*; The perfect Knowledge of the Cause whereof, being hitherto scarcely attained, we shall search and handle in due place.

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Both of them seeme not to generate or produce any other Effect in Nature,

ture, but such as appertaineth to their proper Objects, and Senses, and are otherwise Barren.

But *Both* of them in their owne proper Action, doe worke three manifest *Effects*. The First, in that the *Stronger Species drowneth the Lesser*; As the Light of the Sunne, the light of a Glow-worme; The Report of an Ordnance, the Voice: The Second, in that an *Object of Surcharge or Excesse destroyeth the Sense*; As the Light of the Sunne the Eye, a violent Sound (neare the Eare) the Hearing: The Third, in that *both of them will be reverberate*; As in *Mirroures*; And in *Eccho's*.

Neither of them doth *destroy or hinder the Species of the other*, although they encounter in the same *Medium*; As Light or Colour hinder not Sound; Nor *è contrà*.

Both of them affect the *Sense in Living Creatures*, and yeeld *Objects of Pleasure and Dislike*: Yet neverthelesse, the *Objects* of them doe also (if it be well observed) affect and worke upon dead Things; Namely, such as have some Conformity with the *Organs* of the two *Senses*; As *Visibles* worke upon a *Looking-glasse*, which is like the Pupill of the Eye; And *Audibles* upon the Places of *Eccho*, which resemble, in some sort, the Caverne and structure of the Eare.

Both of them doe *diversly worke*, as they have their *Medium diversly disposed*. So a Trembling *Medium* (as Smoake) maketh the Object seeme to tremble; and a Rising or Falling *Medium* (as Winds) maketh the *Sounds* to rise, or fall.

To *Both*, the *Medium*, which is the most Propitious and Conducibile, is *Aire*; For Glasse or Water, &c. are not comparable.

In *Both* of them, where the *Object is Fine and Accurate*, it conduceth much to have the *Sense Intensive, and Erect*; In so much as you contract your *Eye*, when you would see sharply; And erect your *Eare*, when you would heare attentively; which in Beasts that have Eares moveable, is most manifest.

The *Beames* of *Light*, when they are multiplied, and conglomerate, generate *Heat*; which is a different Action, from the Action of *sight*: And the *Multiplication* and *Conglomeration* of *Sounds* doth generate an extreme *Rarefaction* of the *Aire*; which is an Action materiate, differing from the Action of *Sound*; If it bee true (which is anciently reported) that *Birds*, with great shouts, have fallen downe.

H3

DIS-

DISSENTS OF VISIBLES, and Audibles.

268 **T**He *Species* of *Visibles* seeme to bee *Emissions* of *Beames* from the *Object* scene; Almost like *Odours*; save that they are more *Incorporeall*: But the *Species* of *Audibles* seeme to Participate more with *Locall Motion*, like *Perceptions*, or *Impressions* made upon the *Aire*. So that whereas all *Bodies* doe seeme to worke in two manners; Either by the *Communication* of their *Natures*; Or by the *Impressions* and *Signatures* of their *Motions*; The *Diffusion* of *Species Visible* seemeth to participate more of the former *Operation*; and the *Species Audible* of the latter.

269 The *Species* of *Audibles* seeme to bee carried more manifestly thorow the *Aire*, than the *Species* of *Visibles*: For (I conceive) that a Contrary strong Wind will not much hinder the Sight of *Visibles*, as it will doe the Hearing of *Sounds*.

270 There is one *Difference*, above all others, betweene *Visibles* and *Audibles*, that is the most remarkable; as that wherupon many smaller Differences doe depend: Namely, that *Visibles*, (except *Lights*,) are carried in *Right Lines*; and *Audibles* in *Arcuate Lines*. Hence it commeth to passe, that *Visibles* doe not intermingle, and confound one another, as hath beene said before; But *Sounds* doe. Hence it commeth, that the Solidity of *Bodies* doth not much hinder the Sight, so that the *Bodies* be cleare, and the Pores in a *Right Line*, as in *Glasse*, *Chrystall*, *Diamonds*, *Water*, &c. But a thin Scarfe, or *Handkerchiefe*, though they be *Bodies* nothing so solide, hinder the Sight: Whereas (contrariwise) these *Porous Bodies* doe not much hinder the Hearing, but solide *Bodies* doe almost stop it, or at the least attenuate it. Hence also it commeth, that to the *Reflexion* of *Visibles*, small *Glasses* suffice; but to the *Reverberation* of *Audibles*, are required greater Spaces, as hath likewise beene said before.

271 *Visibles* are scene further off, than *Sounds* are heard; Allowing nevertheless the *Rate* of their *Bignesse*: For otherwise a great *Sound* will be heard further off, than a small *Body* scene.

272 *Visibles* require (generally) some *Distance* betweene the *Object*, and the *Eye*, to bee better scene; Wheras in *Audibles*, the nearer the Approach of the *Sound* is to the Sense, the better. But in this there may be a double *Errour*. The one, because to *Seeing*, there is required *Light*; And any thing that toucheth the *Pupill* of the *Eye* (all over,) excludeth the *Light*. For I have heard of a Person very credible, (who himselfe was cured of a *Cataract* in one of his *Eyes*,) that while the *Silver Needle* did worke upon the Sight of his *Eye*, to remove the *Filme* of the *Cataract*,

fact, he never saw any thing more cleare or perfect, than that white Needle: Which (no doubt,) was, because the Needle was lesse than the *Pupill* of the *Eye*, and so tooke not the Light from it. The other Error may be, for that the *Object* of *sight* doth strike upon the *Pupill* of the *Eye*, directly without any interception; whereas the *Cave* of the *Eare* doth hold off the *Sound* a little from the Organ: And so neverthelesse there is some *Distance* required in both.

Visibles are swifter carried to the *Sense*, than *Audibles*; As appeareth in Thunder and Lightning; Flame and Report of a Peece; Motion of the Aire in Hewing of Wood. All which have beene set downe heretofore, but are proper for this Title.

I conceive also, that the *Species* of *Audibles* doe hang longer in the Aire, than those of *Visibles*: For although even those of *Visibles*, doe hang some time, as we see in *Rings turned*, that shew like Spheres; In *Lute-strings* fillipped; A *Fire-brand* caried along, which leaveth a Traine of Light behinde it; and in the *Twilight*; And the like: Yet I conceive that *Sounds* stay longer, because they are carried up and downe with the Winde: And because of the Distance of the Time, in *Ordinance discharged*, and heard twenty Miles off.

In *Visibles*, there are not found *Objects* so odious and ingrate to the *Sense*, as in *Audibles*. For foule *Sights* doe rather displease, in that they excite the Memory of foule Things, than in the immediate *Objects*. And therefore in *Pictures*, those foule *Sights* doe not much offend; But in *Audibles*, the Grating of a Saw, when it is sharpened, doth offend so much, as it setteth the Teeth on Edge. And any of the *harsh Discords* in *Musicke*, the *Eare* doth straight-ways refuse.

In *Visibles*, after great Light, if you come suddenly into the *Darke*; Or contrariwise, out of the *Darke* into a *Glaring light*, the *Eye* is dazled for a time, and the *Sight* confused; But whether any such Effect be after great *Sounds*, or after a *deepe Silence*, may be better enquired. It is an old Tradition, that those that dwell neare the *Cataracts* of *Nilus*, are stricken deafe: But we finde no such effect, in *Cannoniers*, nor *Millers*, nor those that dwell upon *Bridges*.

It seemeth that the *Impression* of *Colour* is so weake, as it worketh not but by a Cone of Direct *Beames*, or Right Lines; whereof the Basis is in the *Object*, and the Verticall Point in the *Eye*; So as there is a *Conradiation* and *Conjunction* of *Beames*; And those *Beames* so sent forth, yet are not of any force to beget the like borrowed or second *Beames*, except it be by *Reflexion*, whereof we speake not. For the *Beames* passe, and give little *Tincture* to that Aire, which is Adjacent; which if they did, we should see *Colours* out of a Right line. But as this is in *Colours*, so otherwise it is in the *Body of Light*. For when there is a *Skreene* between the *Candle* and the *Eye*, yet the *Light* passeth to the *Paper* whereon One writeth; So that the *Light* is seene, where the *Body* of the *Flame* is not seene; And where any *Colour* (if it were placed where the *Body* of the *Flame* is) would not be seene. I judge that *Sound* is of this Latter Nature.

Experiments
in Consort,
touching the
Sympathy or
Antipathy of
Sounds, one
with another.

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ture: For when two are placed on both sides of a Wall, and the Voice is heard, I judge it is not onely the *Originall Sound*, which passeth in an *Arched Line*; But the *Sound*, which passeth above the Wall in a *Right Line*, begetteth the like Motion round about it, as the first did, though more weake.

ALL *Concords* and *Discords* of *Musicke*, are (no doubt) *Sympathies*, and *Antipathies* of *Sounds*. And so (likewise) in that *Musicke*, which we call *Broken Musicke*, or *Consort Musicke*; Some *Consorts* of *Instruments* are sweeter than others; (A Thing not sufficiently yet observed:) As the *Irish Harpe*, and *Base Violl* agree well; The *Recorder* and *Stringed Musicke* agree well; *Organs* and the *Voice* agree well; &c. But the *Virginalls* and the *Lute*; Or the *Welch-Harpe*, and *Irish-Harpe*; Or the *Voice* and *Pipes* alone, agree not so well; But for the *Melioration* of *Musicke*, there is yet much left (in this Point of *Exquisite Consorts*) to try and enquire.

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There is a Common Observation, that if a *Lute*, or *Violl*, be layed upon the Backe, with a small Straw upon one of the *Strings*; And another *Lute* or *Violl* be laid by it; And in the other *Lute*, or *Violl*, the *Unison* to that *String* be stricken; it will make the *String* move; Which will appeare both to the Eye, and by the *Strawes* Falling off. The like will be, if the *Diapason* or *Eight* to that *String* be stricken, either in the same *Lute*, or *Violl*, or in others lying by; But in none of these there is any Report of *Sound*, that can be discerned, but onely Motion.

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It was devised, that a *Violl* should have a Lay of Wire Strings below, as close to the Belly, as a *Lute*; And then the *Strings* of Guts mounted upon a Bridge, as in Ordinary *Violls*; To the end, that by this means, the upper *Strings* stricken, should make the lower resound by *Sympathy*, and so make the *Musicke* the better; Which, if it be to purpose, then *Sympathy* worketh, as well by Report of *Sound*, as by Motion. But this device I conceive to be of no use; because the upper *Strings*, which are stopped in great variety, cannot maintaine a *Diapason* or *Unison*, with the Lower, which are never stopped. But if it should be of use at all; it must be in *Instruments* which have no Stops; as *Virginalls*, and *Harpes*; where-in triall may be made of two Rows of *Strings*, distant the one from the other.

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The Experiment of *Sympathy* may be transferred (perhaps) from *Instruments* of *Strings*, to other *Instruments* of *Sound*. As to try if there were in one Steeple, two Bells of *Unison*, whether the striking of the one would move the other, more than if it were another Accord: And so in *Pipes*, (if they be of equall Bore, and *Sound*,) whether a little Straw or Feather would move in the one *Pipe*, when the other is blowne at an *Unison*.

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It seemeth, both in *Eare*, and *Eye*, the *Instrument* of *Sense* hath a *Sympathy* or Similitude with that which giveth the *Reflexion*; (As hath beene touched before.) For as the *Sight* of the *Eye* is like a *Crystall*, or *Glasse*, or *Water*; So is the *Eare* a sinuous Cave, with a hard Bone, to

stop

stop and reverberate the *Sound*: Which is like to the Places that report *Eccho's*.

When a Man *ravneeth*, he cannot *Heare* so well. The *Cause* is, for that the *Membrane* of the *Eare* is extended; And so rather casteth off the *Sound*, than draweth it to.

We *Heare* better when we *hold our Breath*, than contrary; In so much as in all *Listening* to attaine a *Sound* a farre off, Men *hold their Breath*. The *Cause* is, For that in all *Expiration*, the Motion is *Outwards*; And therefore, rather driveth away the voice, than draweth it: And besides we see, that in all *Labour* to doe things with any strength, wee *hold the Breath*: And *listening* after any *Sound*, that is heard with difficultie, is a kinde of *Labour*.

Let it be tryed, for the *Helpe* of the *Hearing*, (and I conceive it likely to succeed,) to make an *Instrument* like a *Tunnell*; The narrow Part whereof may be of the *Bignesse* of the Hole of the *Eare*; And the *Broader End* much larger, like a *Bell* at the *Skirts*; And the length halfe a foot, or more. And let the narrow End of it be set close to the *Eare*: And marke whether any *Sound*, abroad in the open *Aire*, will not be heard distinctly, from further distance, than without that *Instrument*; being (as it were) an *Eare-Spectacle*. And I have heard there is in *Spaine*, an *Instrument* in use to be set to the *Eare*, that *helpeth* somewhat those that are *Thicke* of *Hearing*.

If the *Mouth* be shut close, neverthelesse there is yeelded by the *Roofe* of the *Mouth*, a *Murmur*. Such as is used by dumbe Men: But if the *Nostrills* be likewise stopped, no such *Murmur* can be made; Except it be in the *Bottom* of the *Pallate* towards the *Throat*. Whereby it appeareth manifestly, that a *Sound* in the *Mouth*, except such as aforesaid, if the *Mouth* be stopped, passeth from the *Pallate*, thorow the *Nostrills*.

The *Repercussion* of *Sounds*, (which we call *Eccho*,) is a great Argument of the *Spiritual* Essence of *Sounds*. For if it were *Corporeall*, the *Repercussion* should be created in the same manner, and by like *Instruments*, with the *Originall Sound*: But we see what a Number of *Exquisite Instruments* must concur in *Speaking* of *Words*, whereof there is no such Matter in the *Returning* of them; But onely a plaine *Stop*, and *Repercussion*.

The *Exquisite Differences* of *Articulate Sounds*, carried along in the *Aire*, shew that they cannot be *Signatures* or *Impressions* in the *Aire*, as hath beene well refuted by the *Ancients*. For it is true, that *Seales* make excellent *Impressions*: And so it may be thought of *Sounds* in their first *Generation*: But then the *Delation* and *Continuance* of them without any new *Sealing*, shew apparently they cannot be *Impressions*.

All *Sounds* are suddenly made, and doe suddenly perish; But neither that, nor the *Exquisite Differences* of them, is Matter of so great *Admiration*: For the *Quaverings*, and *Warblings* in *Lutes*, and *Pipes*, are

Experiments
in Confort,
touching the
Hindring or
Helping of the
Hearing.

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Experiments
in Confort,
touching the
Spiritual and
Fine Nature
of *Sounds*.

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are as swift; And the Tongue, (which is no very fine Instrument,) doth in Speech, make no fewer Motions, than there be Letters in all the Words, which are uttered. But that *Sounds* should not onely be so speedily generated, but carried so farre every way, in such a momentary time, deserveth more Admiration. As for Example; If a Man stand in the middle of a Field, and speake aloud, he shall be heard a Furlong in round; And that shall be in *Articulate Sounds*; And those shall be Entire in every little Portion of the Aire; And this shall be done in the Space of lesse than a Minute.

The *Sudden Generation* and *Perishing* of *Sounds*, must be one of these two Wayes. Either that the *Aire* suffereth some Force by *sound*, and then restoreth it selfe; As Water doth; Which being divided, maketh many Circles, till it restore it selfe to the naturall Consistence: Or otherwise, that the *Aire* doth willingly imbibe the *Sound* as gratefull, but cannot maintaine it; For that the *Aire* hath (as it should seeme) a secret and hidden Appetite of Receiuing the *Sound* at the first; But then other Grosse and more Materiate Qualities of the Aire straight-wayes suffocate it; Like unto *Flame*, which is generated with Alacritie, but straight quenched by the Enmitie of the *Aire*, or other Ambient Bodies.

There be these *Differences* (in generall) by which *Sounds* are divided; 1. *Musically, Immusically*; 2. *Treble, Base*; 3. *Flat, Sharpe*; 4. *Soft, Loud*; 5. *Exteriour, Interiour*; 6. *Cleane, Harsh* or *Purling*; 7. *Articulate, Inarticulate*.

We have laboured (as may appeare,) in this *Inquisition* of *Sounds*, diligently; Both because *Sound* is one of the most Hidden Portions of *Nature*, (as we said in the beginning;) And because it is a *Vertue* which may be called *Incorporeall*, and *Immateriate*; whereof there be in *Nature* but few. Besides, we were willing, (now in these our first Centuries,) to make a Patterne or President of an *Exact Inquisition*; And we shall doe the like hereafter in some other Subjects which require it. For wee desire that Men should learne and perceive, how severe a Thing the true *Inquisition* of *Nature* is; And should accustome themselves, by the light of Particulars, to enlarge their Mindes, to the Amplitude of the World; And not reduce the World to the Narrownesse of their Mindes.

Experiment
Solitary touching the Ori-

Metalls give *Orient* and *Fine Colours* in *Dissolutions*; As *Gold* giveth an excellent *Yellow*; *Quick-Silver* an excellent *Greene*; *Tinne* giveth

giveth an excellent Azure: Likewise in their *Putrefactions*, or *Rusts*; As *Vermilion*, *Verdegrease*, *Bise*, *Cirrus*, &c. And likewise in their *Vitrifications*. The *Cause* is, for that by their Strength of Body, they are able to endure the Fire, or Strong Waters, and to be put into an Equall Posture; And againe to retaine Part of their principall Spirit; Which two Things, (Equall Posture, and Quicke Spirits) are required chiefly, to make *Colours* lightsome.

ent Colours, in
dissolution of
Metalls.

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IT conduceth unto *Long life*, and to the more Placide Motion of the Spirits, which thereby doe lesse prey and consume the Juyce of the Body; Either that *Mens Actions* be free and voluntary; That nothing be done *Invitâ Minervâ*, but *Secundum Genium*: Or on the other side, that the *Actions* of *Men* be full of Regulation, and Commands within themselves: For then the Victory and Performing of the Command, giveth a good Disposition to the Spirits; Especially if there be a Proceeding from Degree to Degree; For then the Sense of Victory is the greater. An example of the former of these, is in a Countrey life; And of the latter, in *Monkes* and *Philosophers*, and such as doe continually enjoyne themselves.

Experiment
Solitary tou-
ching Prolon-
gation of Life.

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IT is certaine, that in all Bodies, there is an *Appetite* of *Vnion*, and Evitation of Solution of Continuities: And of this *Appetite* there be many Degrees; But the most Remarkable, and fit to be distinguished, are three. The first in *Liquours*; The second in *Hard Bodies*; And the third in *Bodies Cleaving* or *Tenacious*. In *Liquours*, this *Appetite* is weak: Wee see in *Liquours*, the Thredding of them in *Stillicides*, (as hath beene said;) The Falling of them in *Round Drops*, (which is the forme of *Vnion*;) And the Staying of them, for a little time, in *Bubbles* and *Froth*. In the second Degree or *Kinde*, this *Appetite* is strong; As in *Iron*, in *Stone*, in *Wood*, &c. In the third, this *Appetite* is in a *Medium* betweene the other two: For such *Bodies* doe partly follow the Touch of another Body; And partly sticke and continue to themselves; And therefore they roape, and draw themselves in Threds; As wee see in *Pitch*, *Glew*, *Birdlime*, &c. But note, that all *Solide Bodies* are *Cleaving*, more or lesse: And that they love better the Touch of somewhat that is *Tangible*, than of *Aire*. For *Water*, in small quantitie, cleaveth to any Thing that is *Solide*; And so would *Metall* too, if the weight drew it not off. And therefore *Gold Foliate*, or any *Metall Foliate*, cleaveth: But those *Bodies* which are noted to be *Clammy*, and *Cleaving*, are such, as have a more indifferent *Appetite* (at once,) to follow another Body; And to hold to themselves. And therefore they are commonly *Bodies* ill mixed; And which take more pleasure in a *Forraine Body*, than in perserving their owne *Consistence*; And which have little

Experiment
Solitary tou-
ching Appetite
of Vnion in Bo-
dies.

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Experiment
Solitary tou-
ching the like
Operations of
Heat, and Time.

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the predominance in *Drought*, or *Moisture*.

Time, and Heat, are Fellowes in many Effects. Heat drieth Bodies, that doe easily expire; As Parchment, Leaves, Roots, Clay, &c. And, so doth Time or Age arene; As in the same Bodies, &c. Heat dissolveth and melterh Bodies, that keepe in their Spirits; As in divers *Liquefactions*; And so doth Time, in some Bodies of a softer Consistence: As is manifest in Honey, which by Age waxeth more liquid; And the like in Sugar; And so in old Oyle, which is ever more cleare, and more hot in Medicinable use. Heat causeth the Spirits to search some Issue out of the Body; As in the *Volatilirie* of *Metalls*; And so doth Time; As in the *Rust* of *Metalls*. But generally Heat doth that in small time, which Age doth in long.

Experiment
Solitary tou-
ching the differ-
ring Operations
of Fire, and
Time.

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Some Things which passe the Fire are softest at first, and by Time grow hard; As the Crumme of Bread. Some are harder when they come from the Fire, and afterwards give againe, and grow soft, as the Crust of Bread, Bisket, Sweet Meats, Salt, &c. The Cause is, for that in those things which waxe Hard with Time, the Worke of the Fire is a Kinde of *Melting*: And in those that waxe Soft with Time, (contrariwise,) the worke of the Fire is a Kinde of *Baking*; And whatsoever the Fire baketh, Time doth in some degree dissolve.

Experiment
Solitary tou-
ching Motions
by Imitation.

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Motions passe from one Man to another, not so much by Exciting Imagination; as by Invitation; Especially if there be an Aptnesse or Inclination before. Therefore *Gaping*, or *Yawning*, and *Stretching* doe passe from Man to Man; For that that causeth *Gaping* and *Stretching* is, when the Spirits are a little Heavie, by any Vapour, or the like. For then they strive, (as it were,) to wring out, and expell that which loadeth them. So Men drowzie, and desirous to sleepe: Or before the Fit of an Ague; doe use to Yawne and Stretch; And doe likewise yeeld a *Voice* or *Sound*, which is an *Interjection* of *Expulsion*: So that if another be apt and prepared to doe the like, hee followeth by the Sight of another. So the *Laughing* of another maketh to *Laugh*.

Experiment
Solitary, tou-
ching Infecti-
ous Diseases.

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There be some knowne *Diseases* that are *Infectious*; And Others that are not. Those that are *Infectious*, are; First, such as are chiefly in the *Spirits*, and not so much in the *Humours*; And therefore passe easily from Body to Body: Such are *Pestilences*, *Lippitudes*, and such like. Secondly, such as Taint the *Breath*; Which wee see passeth manifestly from Man to Man; And not invisible, as the *Affects* of the *Spirits* doe: Such are *Consumptions* of the *Lungs*, &c. Thirdly, such as come forth to the *Skinne*; And therefore taint the *Aire*, or the *Body Adjacent*.

Adjacent; Especially if they consist in an *Vnctuous Substance*, not apt to dissipate; Such are *Scabs*, and *Leprosie*. Fourthly, such as are merely in the *Humours*, and not in the *Spirits*, *Breath*, or *Exhalations*: And therefore they never infect, but by *Touch* onely; And such a *Touch*, also as cometh within the *Epidermis*; As the *Venome* of the *French Poxe*; And the *Biting* of a *Mad Dog*.

Most *Powders* grow more *Close* and *Coherent* by *Mixture* of *Water*, than by *Mixture* of *Oyle*, though *Oyle* bee the thicker Body; As *Meale*; &c. The Reason is, the *Congruity* of *Bodies*; which if it bee more, maketh a *Perfector Imbibition*, and *Incorporation*, Which in most *Powders* is more betweene *Them* and *Water*, than betweene *Them* and *Oyle*: But *Painters Colours* ground, and *Asbes*, doe better incorporate with *Oyle*.

Experiment
Solitary tou-
ching the in-
corporation of
Powders and
Liquors.

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Much *Motion* and *Exercise* is good for some *Bodies*; And *Sitting*, and *lesse Motion* for others. If the Body be *Hot*, & *Void* of *Superfluous Moistures*, too much *Motion* hurteth: And it is an *Errour* in *Physicians*, to call too much upon *Exercise*. Likewise Men ought to beware, that they use not *Exercise*, and a *Spare Diet* both: But if much *Exercise*, then a *Plentiful Diet*; And if *Sparing Diet*, then little *Exercise*. The *Benefits* that come of *Exercise* are, First, that it sendeth *Nourishment* into the *Parts* more forcibly. Secondly, that it helpeth to *Excerne* by *Sweat*, and so maketh the *Parts* assimilate the more perfectly. Thirdly, that it maketh the *Substance* of the *Body* more *Solide* and *Compact*; And so lesse apt to be *Consumed* and *Depredated* by the *Spirits*. The *Evills* that come of *Exercise*, are: First, that it maketh the *Spirits* more *Hot* and *Predatory*. Secondly, that it doth absorb likewise, and attenuate too much the *Moisture* of the *Body*. Thirdly, that it maketh too great *Concussion*, (especially if it be violent,) of the *Inward Parts*; which delight more in *Rest*. But generally *Exercise*, if it bee much, is no *Friend* to *Prolongation* of *Life*; Which is one Cause, why *women* live longer than *Men*, because they stirre lesse.

Experiment
Solitary tou-
ching *Exercise*
of the *Body*.

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Some *Food* we may use *long*, and *much*, without *Glusting*; As *Bread*, *Flesh* that is not fat, or rancke, &c. Some other, (though pleasant,) *Glatteth* sooner; As *Sweet Meats*, *Fat Meats*, &c. The Cause is, for that *Appetite* consisteth in the *Emptiness* of the *Mouth* of the *Stomacke*; Or possessing it with somewhat that is *Astringent*; And therefore *Cold* and *Dry*. But things that are *Sweet* and *Fat*, are more *Filling*: And doe swimme and hang more about the *Mouth* of the *Stomacke*; And goe not downe so speedily: And againe turne sooner to *Choler*, which is hot, and ever abateth the *Appetite*. Wee see also, that another Cause of *Satiety*, is an *Over-Custome*; and of *Appetite* is *Novelty*: And therefore *Meats*, if the same be continually taken, induce *Loathing*. To give the Reason of the *Distaste* of *Satiety*, and of the *Pleasure*

Experiment
Solitary, tou-
ching *Meats*,
that induce *Sa-
tiety*.

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NATVRALL HISTORIE.

IV. Century.



ACCCELERATION of *Time*, in *Works* of *Nature*, may well be esteemed *Inter Magnalia Naturæ*. And even in *Divine Miracles*, *Accelerating* of the *Time*, is next to the *Creating* of the *Matter*. Wee will now therefore proceed to the Enquiry of it : And for *Acceleration* of *Germination*, we will referre it over unto the place, where we shall handle the Subject of *Plants*, generally ; And will now begin with other *Accelerations*.

Liquours are (many of them,) at the first, thicke and troubled ; As *Must*, *Wort*, *Iuyces* of *Fruits*, or *Herbs* expressed, &c. And by *Time* they settle, and Clarifie. But to make them cleare, before the *Time*, is a great Worke ; For it is a Spurre to *Nature*, and putteth her out of her pace : And besides, it is of good use, for making *Drinckes*, and *Sauces*, Potable, and Serviceable, speedily ; But to know the *Meanes* of *Accelerating Clarification*, we must first know the *Causes* of *Clarification*. The first *Cause* is, by the *Seperation* of the *Grosser Parts* of the *Liquour*, from the *Finer*. The second, by the *Equall Distribution* of the *Spirits* of the *Liquour*, with the *Tangible Parts* : For that ever representeth Bodies Cleare and Vntroubled.

Experiments
in Consort,
touching the
Clarification of
Liquours, and
the Accelerating
thereof.

bled. The third, by the *Refining* the *Spirit* it selfe, which thereby giveth to the *Liquour* more Splendour, and more Lustre.

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First, for *Separation*; It is wrought by *weight*; As in the ordinary Residence or Settlement of *Liquours*: By *Heat*: By *Motion*: By *Precipitation*, or *Sublimation*; (That is a Calling of the severall Parts, either up, or downe, which is a kinde of *Attraction*;) By *Adhesion*; As when a Body more *Viscous* is mingled and agitated with the *Liquour*, which *Viscous* Body (afterwards severed) draweth with it the grosser Parts of the *Liquour*: And Lastly, By *Percolation* or *Passage*.

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Secondly, for the *Even Distribution* of the *Spirits*; It is wrought By *Gentle Heat*; And By *Agitation* or *Motion*; (For of *Time* we speak not, because it is that, we would anticipate and represent:) And it is wrought also, By *Mixture* of some other *Body*, which hath a vertue to open the *Liquour*, and to make the *Spirits* the better passe thorow.

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Thirdly, for the *Refining* of the *Spirit*, it is wrought likewise By *Heat*; By *Motion*; And By *Mixture* of some *Body* which hath *Vertue* to attenuate. So therefore (Having shewen the *Causes*) for the *Accelerating* of *Clarification*, in generall, and the *Enducing* of it; take these *Instances*, and *Trialls*.

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It is in common Practice, to draw *Wine*, or *Beere*, from the *Lees*, (which wee call *Racking*;) wherby it will *Clarifie* much the sooner: For the *Lees*, though they keepe the *Drinke* in Heart, and make it lasting; yet withall they cast up some *Spissitude*: And this *Instance* is to be referred to *Separation*.

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One the other side, it were good to try, what the Adding to the *Liquour* more *Lees* than his owne will worke; For though the *Lees* doe make the *Liquour* turbide, yet they refine the *Spirits*. Take therefore a Vessell of *New Beere*; And take another Vessell of *New Beere*, and Rack the one Vessell from the *Lees*, and power the *Lees* of the Racked Vessell into the unracked Vessell, and see the Effect: This *Instance* is referred to the *Refining* of the *Spirits*.

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Take *New Beere*, and put in some Quantitie of *Stale Beere* into it, and see whether it will not accelerate the *Clarification*, by Opening the Body of the *Beere*, and Cutting the Grosser Parts, wherby they may fall downe into *Lees*. And this *Instance* againe is referred to *Separation*.

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The longer *Malt*, or *Herbs*, or the like, are Infused in *Liquour*, the more thicke and troubled the *Liquour* is; But the longer they be decocted in the *Liquour*, the clearer it is. The reason is plaine, because in *Infusion*, the longer it is, the greater is the Part of the Grosse Body, that goeth into the *Liquour*: But in *Decoction*, though more goeth forth, yet it either purgeth at the Top, or settleth at the Bottome. And therefore the most Exact Way to *Clarifie* is; First to *Infuse*, and then to take off the *Liquour*, and *Decoct* it; as they doe in *Beere*, which hath *Malt* first Infused in the *Liquour*, and is afterwards boiled with the Hop. This also is referred to *Separation*.

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Take *Hot Embers*, and put them about a Bottle filled with *New Beere*, almost

almost to the very Neck: Let the Bottle be well stopped, left it lie out: And continue it, renewing the Embers every day, by the space of Ten Dayes; and then compare it with another Bottle of the same Beere set by. Take also Lime both *Quenched*, and *Vnquenched*, and set the Bottles in them, *ut supra*. This Instance is referred, both to the *Even Distribution*, and also to the *Refining of the Spirits by Heat*.

Take Bottles, and swing them; Or carry them in a *Wheele-Barrow*, upon *Rough Ground*; twice in a day: But then you may not fill the Bottles full, but leave some Aire; For if the *Liquour* come close to the Stopple, it cannot play, nor flower: And when you have shaken them well, either way, poure the *Drinke* into another Bottle, stopped close, after the usuall manner; For if it stay with much Aire in it, the *Drinke* will pall; neither will it settle so perfectly in all the Parts. Let it stand some 24. houres: Then take it, and put it againe into a Bottle with Aire, *ut supra*: And thence into a Bottle stopped *ut supra*: And so repeat the same Operation for seven dayes. Note that in the Emptying of one Bottle into another, you must doe it swiftly, lest the *Drinke* pall. It were good also, to trie it in a Bottle with a little Aire below the Neck, without Emptying. This Instance is referred to the *Even Distribution* and *Refining of the Spirits by Motion*.

As for *Percolation*, *Inward*, and *Outward*, (which belongeth to *Separation*;) Triall would be made, of *Clarifying by Adhesion*, with Milke put into *New-Beere*, and stirred with it: For it may be that the *Grosser Part* of the *Beere* will cleave to the *Milke*: The Doubt is, whether the *Milke* will sever well againe, Which is soone tried. And it is usuall in *Clarifying Ippocrasse* to put in *Milke*; Which after severeth and carrieth with it the *Grosser Parts* of the *Ippocrasse*, as hath beene said elsewhere. Also for the better *Clarification* by *Percolation*, when they tun *New Beere*, they use to let it passe through a *Strainer*; And it is like the finer the *Strainer* is, the clearer it will be.

The *Accelerating of Maturation* wee will now enquire of. And of *Maturation* it selfe. It is of three Natures. The *Maturation of Fruits*: The *Maturation of Drinckes*: And the *Maturation of Impostumes*, and *Vlcers*. This last we referre to another Place, where wee shall handle *Experiments Medicinall*. There be also other *Maturations*, as of *Metalls*, &c. whereof wee will speake as Occasion serveth. But we will begin with that of *Drinckes*, because it hath such Affinitie with the *Clarification of Liquours*.

For the *Maturation of Drinckes*, it is wrought by the *Congregation of the Spirits* together, whereby they digest more perfectly the *Grosser Parts*; And it is effected partly, by the same means, that *Clarification* is, (whereof wee spake before;) But then note, that an *Extreme Clarification* doth

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Experiments in Consort touching *Maturation*, and the *Accelerating* thereof. And first touching the *Maturation* and *Quickning of Drinckes*. And next touching the *Maturation of Fruits*.

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spread the *Spirits* so Smooth, as they become Dull, & the *Drinke* dead, which ought to have a little Flouring. And therefore all your Cleare *Amber Drinke* is flat.

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We see the *Degrees of Maturation of Drinckes*; In *Must*; In *Wine*, as it is drunke; And in *Vinegar*. Whereof *Must* hath not the *Spirits* well Congregated; *Wine* hath them well united; so as they make the Parts somewhat more Oylie: *Vinegar* hath them Congregated, but more Jeune, and in smaller Quantitie; The greatest and finest Spirit and Part being exhaled: For we see *Vinegar* is made by setting the Vessel of *Wine* against the hot Sun: And therefore *Vinegar* will not burne; For that much of the Finer Parts is Exhaled.

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The *Refreshing and Quickning of Drinke* Palled, or Dead, is by *Enforcing the Motion of the Spirit*: So wee see that *Open Weather* relaxeth the *Spirit*, and maketh it more lively in *Motion*. Wee see also *Bottling of Beere*, or *Ale*, while it is New, and full of *Spirit*, (so that it spirteth when the Stopple is taken forth) maketh the *Drinke* more quicke and windie. A *Pan of Coales* in the *Cellar* doth likewise good, and maketh the *Drinke* worke againe. *New Drinke*, put to *Drinke* that is Dead, provoketh it to worke againe: Nay, which is more, (as some affirme,) A *Brewing of New Beere*, set by *Old Beere*, maketh it worke againe. It were good also to *Enforce the Spirits* by some *Mixtures*, that may excite and quicken them; As by putting into the *Bottles*, *Nitre*, *Chalke*, *Lime*, &c. We see *Creame* is *Matured*, and made to rise more speedily, by Putting in *Cold Water*; which, as it seemeth, getteth downe the *whey*.

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It is tried, that the *Burying of Bottles of Drinke* well stopped, either in drie *Earth*, a good depth; Or in the *Bottom* of a *well* within *Water*; And best of all the *Hanging of* them in a deepe *Well* somewhat above the *water*, for some fortnights space is an Excellent *Meane* of making *Drinke* fresh, and quicke: for the *Cold* doth not cause any *Exhaling of the Spirits* at all; As *Heat* doth, though it rarifieth the rest that remaine: But *Cold* maketh the *Spirits* vigorous, and irritateth them, whereby they incorporate the *Parts of the Liqueur* perfectly.

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As for the *Maturation of Fruits*; It is wrought by the *Calling forth of the Spirits of the Body outward*, and so *Spreading* them more smoothly: And likewise by *Digesting*, in some degree, the *Grosser Parts*: And this is Effected, by *Heat*; *Motion*; *Attraction*; And by a *Rudiment of Putrefaction*: For the *Inception of Putrefaction* hath in it a *Maturation*.

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There were taken *Apples*, and laid in *Straw*; In *Hay*; In *Flower*; In *Chalke*; In *Lime*; Covered over with *Onions*; Covered over with *Crabs*; Closed up in *wax*; Shut in a *Box*: &c. There was also an *Apple* hanged up in *smoake*: Of all which the *Experiment* sortied in this Manner.

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After a *Moneths Space*, the *Apple* Enclosed in *Wax*, was as *Greene* and *Fresh* as at the first Putting in, and the *Kernell* continued *White*. The *Cause* is, for that all *Exclusion of Open Aire*, (which is ever *Predatory*) maintaineth the *Body* in his first *Freshnesse*, and *Moisture*: But the *Inconvenience*

convenience is, that it tasteth a little of the *Wax*: Which, I suppose, in a *Pomgranate*, or some such thick-coated *Fruit*, it would not doe.

The *Apple* Hanged in the *Smoake*, turned like an Old Mellow *Apple*, Wrinkled, Drie, Soft, Sweet, Yellow within. The Cause is, for that such a degree of *Heat*, which doth neither Melt, nor Scorch, (For we see that in a greater *Heat*, a Roast *Apple* Softneth and Melreth, And *Pigs-feet*, made of Quarters of *Wardens*, scorch and have a Skinne of Cole) doth Mellow, and not Adure: The *Smoake* also maketh the *Apple* (as it were) sprinkled with *Suor*, which helpeth to Mature. We see that in *Drying* of *Pears*, and *Prunes*, in the Oven, and Removing of them often as they begin to Sweat, there is a like Operation; But that is with a farre more Intense degree of *Heat*.

The *Apples* covered in the *Lime* and *Ashes*, were well Matured; As appeared both in their Yellownesse, and Sweetnesse. The Cause is, for that that Degree of *Heat* which is in *Lime*, and *Ashes*, (being a Smothering *Heat*) is of all the rest most Proper; for it doth neither Liquefie, nor Arefie; And that is true *Maturation*. Note that the Taste of those *Apples* was good; And therefore it is the Experiment fittest for Use.

The *Apples*, Covered with *Crabs*, and *Onions*, were likewise well Matured. The Cause is, not any *Heat*; But for that the *Crabs* and the *Onions* draw forth the *Spirits* of the *Apple*, and spread them equally thorowout the *Body*; which taketh away Hardnesse. So we see one *Apple* ripeneth against another. And therefore in making of *Cider*, they turne the *Apples* first upon a heape. So one Cluster of *Grapes*, that toucheth another whilest it groweth, ripeneth faster; *Botrus contra Botrum citius maturescit*.

The *Apples* in *Hay*, and the *Straw*, ripened apparently, though not so much as the Other; But the *Apple* in the *Straw* more. The Cause is, for that the *Hay* and *Straw* have a very low degree of *Heat*, but yet Close and Smothering, and which drieth not.

The *Apple* in the Close Box, was ripened also: The Cause is, for that all Aire, kept close, hath a degree of warmth: As we see in *wooll*, *Fur*, *Flus*, &c.

Note that all these were Compared with another *Apple*, of the same kinde, that Lay of it selfe: And in Comparison of that, were more Sweet, and more Yellow, and so appeared to be more Ripe.

Take an *Apple*, or *Peare*, or other like *Fruit*, and Rowle it upon a Table hard: Wee see in Common Experience, that the Rowling doth Soften and Sweeten the *Fruit* presently, Which is Nothing but the Smooth Distribution of the *Spirits* into the Parts: For the Unequall Distribution of the *Spirits* maketh the Harshnesse: But this Hard Rowling is betweene Concoction, and a Simple *Maturation*; Therefore, if you should Rowle them but gently, perhaps twice a day; And continue it some seven dayes, it is like they would mature more finely, and like unto the Natural *Maturation*.

Take an *Apple*, and cut out a Peece of the Top, and cover it, to see whether that Solution of Continuitie will not hasten a *Maturation*: We see that

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that where a *Wasp*, or a *Flie*, or a *Worme* hath bitten, in a *Grape*, or any *Fruit*, it will sweeten hastily.

Take an *Apple*, &c. and prick it with a *Pinne* full of *Holes*, not deepe, and smeare it a little with *Sicke*, or *Cinnamon Water*, or *Spirit of Wine*, every day for ten dayes, to see if the *Virtuall Heat* of the *Wine*, or *Strong Waters*, will not *Mature* it.

In these *Trialls* also, as was used in the first, set another of the same *Fruits* by, to *Compare* them: And trie them, by their *Yellownesse*, and by their *Sweetnesse*.

Experiment
Solitary, tou-
ching the Ma-
king of Gold.

The *World* hath beene much abused by the *Opinion* of *Making of Gold*: The *Worke* it selfe I judge to be possible; But the *Meanes* (hitherto propounded) to effect it, are, in the *Practice*, full of *Error* and *Imposture*; And in the *Theory*, full of *unsound Imaginations*. For to say, that *Nature* hath an *Intention* to make all *Metals Gold*; And that, if she were delivered from *Impediments*, she would performe her owne *Worke*; And that, if the *Crudities*, *Impurities*, and *Leprosities* of *Metals* were cured, they would become *Gold*; And that a little *Quantitie* of the *Medicine*, in the *Worke* of *Projection*, will turne a *Sea* of the *Basest Metall* into *Gold*, by *Multiplying*: All these are but *dreames*: And so are many other *Grounds* of *Alchymy*. And to helpe the Matter, the *Alchymists* call in likewise many *Vanities*, out of *Astrologie*; *Naturall Magicke*; *Superstitious Interpretations* of *Scriptures*; *Auricular Traditions*; *Faigned Testimonies* of *Ancient Authors*; And the like. It is true, on the other side, they have brought to light not a few profitable *Experiments*, and thereby made the *World* some amends. But wee, when wee shall come to handle the *Version* and *Transmutation* of *Bodies*; And the *Experiments* concerning *Metalls*, and *Mineralls*; will lay open the true *Wayes* and *Passages* of *Nature*, which may leade to this great *Effect*. And wee commend the *Wit* of the *Chineses*, who despair of *Making of Gold*, but are *Mad* upon the *Making of Silver*: For certain it is, that it is more difficult to make *Gold*, (which is the most *Ponderous* and *Materiate* amongst *Metalls*) of other *Metalls*, lesse *Ponderous*, and lesse *Materiate*; than (*via versa*) to make *Silver* of *Lead*, or *Quick-Silver*; Both which are more *Ponderous* than *Silver*; So that they need

need rather a further Degree of *Fixation*, than any *Condensation*. In the meane time, by Occasion of Handling the *Axiomes* touching *Maturation*, wee will direct a *Triall* touching the *Maturing* of *Metalls*, and thereby Turning some of them into *Gold*. For we conceive indeed, that a perfect good *Concoction*, or *Disgestion*, or *Maturation* of some *Metalls*, will produce *Gold*. And here we call to minde, that we knew a *Dutch-man*, that had wrought himselfe into the beleefe of a great Person, by undertaking that he could make *Gold*: Whose discourse was, that *Gold* might be made; But that the *Alchymists* Over-fired the Worke: For (he said) the *Making* of *Gold* did require a very temperate *Heat*, as being in *Nature* a Subterrany worke, where little *Heat* commeth; But yet more to the *Making* of *Gold*, than of any other *Metall*; And therefore, that he would doe it with a great Lamp, that should carry a Temperate and Equall Heat: And that it was the Worke of many Moneths. The Device of the Lampe was folly; But the Over-firing now used; And the Equall Heat to be required; And the Making it a Worke of some good Time; are no ill Discourses.

We resort therefore to our *Axiomes* of *Maturation*, in Effect touched before. The First is, that there be used a *Temperate Heat*; For they are ever *Temperate Heats* that *Disgest*, and *Mature*: Wherein we meane *Temperate*, according to the *Nature* of the *Subject*; For that may be *Temperate* to *Fruits*, and *Liquours*, which will not worke at all upon *Metalls*. The Second is, that the *Spirit of the Metall* be quickened, and the *Tangible Parts* opened: For without those two Operations, the *Spirit of the Metall*, wrought upon, will not be able to disgest the Parts. The Third is, that the *Spirits* doe spread themselves *Even*, and move not *Subsultorily*; For that will make the Parts Close, and Pliant. And this requireth a Heat, that doth not rise and fall, but continue as *Equall* as may be. The Fourth is, that no *Part of the Spirit* be emitted, but detained: For if there be *Emission of Spirit*, the Body of the *Metall* will be Hard, and Churlish. And this will be performed, partly by the Temper of the Fire; And partly by the closenesse of the Vessell. The Fifth

Fifth is, that there be *Choice made of the likeliest and best Prepared Metall, for the Version*: For that will facilitate the Worke. The Sixth is, that you give *Time enough for the Worke*: Not to prolong Hopes (as the Alchymists doe;) but indeed to give *Nature* a convenient Space to worke in. These Principles are most certaine, and true; Wee will now derive a direction of *Triall* out of them; Which may (perhaps) by further Meditation, be improved.

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Let there be a *small Furnace* made, of a *Temperate Heat*; Let the *Heat* be such, as may keepe the *Metall* perpetually Moulten, and no more; For that above all importeth to the Worke. For the *Materiall*, take *Silver*, which is the *Metall* that in *Nature* Symbolizeth most with *Gold*; Put in also, with the *Silver*, a Tenth Part of *Quick-silver*, and a Twelfth Part of *Nitre*, by weight; Both these to quicken and open the Body of the *Metall*: And so let the Worke be continued by the *Space of Six Moneths*, at the least. I wish also, that there be, at some times, an Injection of some *Oyled Substance*; Such as they use in the Recovering of *Gold*, which by Vexing with Separations hath beene made Churlish: And this is, to lay the Parts more Close and Smooth, which is the Maime Worke. For *Gold* (as we see) is the Closest (and therefore the Heaviest) of *Metalls*: And is likewise the most Flexible, and Tensible. Nore, that to thinke to make *Gold* of *Quick-silver*, because it is the heaviest, is a Thing not to be hoped; For *Quick-silver* will not endure the Mannage of the *Fire*. Next to *Silver*, I thinke *Copper* were fittest to be the *Materiall*.

Experiment
Solitary touch-
ing the Na-
ture of Gold.

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Gold hath these *Natures*: Greatnesse of Weight; Closenesse of Parts; Fixation; Pliantnesse, or Softnesse; Immunitie from Rust; Colour or Tincture of Yellow. Therefore the Sure Way, (though most about,) to make *Gold*, is to know the *Causes* of the Severall *Natures* before rehearsed, and the *Axiomes* concerning the same. For if a Man can make a *Metall*, that hath all these *Properties*, Let Men dispute, whether it be *Gold*, or no?

Experiments
in Consort
touching the
Enducing and
Accelerating of
Putrefaction.

The Enducing and Accelerating of *Putrefaction*, is a Subject of a very Universall Enquiry: For *Corruption* is a Reciprocall to *Generation*: And they Two, are as *Natures* two *Termes* or *Bundaries*; And the *Guides* to *Life* and *Death*. *Putrefaction* is the Worke of the *Spirits* of *Bodies*, which ever are Unquiet to Get forth, and Congregate with the *Aire*, and to enjoy the *Sun-beames*. The *Getting forth*, or Spreading of the *Spirits*, (which is a Degree of *Getting forth*), hath five Differing *Operations*. If
the

the *Spirits* be detained within the Body, and move more violently, there followeth *Colliquation*; As in *Metalls*, &c. If more Mildely, there followeth *Disgestion*, or *Maturation*; As in *Drinckes*, and *Fruits*. If the *Spirits* be not meercly Detained, but Protrude a little, and that Motion be Confused, and Inordinate, there followeth *Putrefaction*; Which ever dissolveth the Consistence of the Body into much Inequality; As in *Flesh*, *Rotten Fruits*, *Shining Wood*, &c. And also in the *Rust* of *Metalls*. But if that Motion be in a certaine Order, there followeth *Vivification*, and *Figuration*; As both in *Living Creatures* bred of *Putrefaction*, and in *Living Creatures Perfect*. But if the *Spirits* issue out of the Body, there followeth *Desiccation*, *Induration*, *Consumption*, &c. As in *Bricke*, evaporation of *Bodies Liquid*, &c.

The Meanes to Enduce and Accelerate *Putrefaction*, are; First by Adding some Crude or Watry Moisture; As in Wetting of any *Flesh*, *Fruit*, *Wood*, with *Water*, &c. For contrariwise *Vnknown* and Oily Substances preserve.

The Second is by *Invitation* or *Excitation*; As when a *Rotten Apple* lyeth close to another *Apple* that is *sound*: Or when *Dung* (which is a Substance already Putrified) is added to other Bodies. And this is also notably scene in *Church-yards*, where they bury much; Where the Earth will consume the *Corps*, in farre shorter time, than other Earth will.

The Third is, by *Clofenesse*, and *Stopping*, which detaineth the *Spirits*, in *Prison*, more than they would; And thereby irritateth them to seeke Issue; As in *Corne*, and *Cloaths*, which wax *Musty*; and therefore Open Aire (which they call *Aer perflabilis*) doth preserve: And this doth appeare more Evidently in *Agues*, which come (most of them, of *Obstructions*, and *Penning* the *Humours*, which thereupon *Putrifie*.

The Fourth is, by *Solution* of *Continuities*; As we see an *Apple* will rot sooner, if it be Cut or Pierced; And so will *Wood*, &c. And so the *Flesh* of *Creatures* alive, where they have received any *Wound*.

The Fifth is, either by the *Exhaling*, or by the *Driving back* of the *Principall Spirits*, which preserve the Consistence of the *Body*; So that when their Government is dissolved, every *Part* returneth to his Nature, or *Homogeny*. And this appeareth in *Urine*, and *Bloud*, when they coole, and thereby breake; It appeareth also in the *Gangrene*, or *Mortification* of *Flesh*, either by *Opiates*, or by *Intense Colds*. I conceive also the same Effect is in *Pestilences*, for that the *Malignitie* of the *Infecting Vapour*, daunceth the *Principall Spirits*, and maketh them flie, and leave their *Regiment*; And then the *Humours*, *Flesh*, and *Secondary Spirits*, doe dissolve, and breake, as in an *Anarchy*.

The

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The Sixth is, when a *Ferraine Spirit*, Stronger and more Eager than the *Spirits of the Body*, encreth the Body; As in the Stinging of Serpents. And this is the Cause (generally) that upon all *Poysons* followeth Swelling: And we see Swelling followeth also, when the *Spirits* of the Body it selfe, Congregate too much; As upon *Blowes*, and *Bruises*; Or when they are pent in too much, as in swelling upon Cold. And we see also, that the *Spirits* coming of *Putrefaction* of *Humours* in *Agues*, &c. Which may be counted as *Ferraine Spirits*, though they be bred within the Body, doe Extinguish and Suffocate the *Naturall Spirits*, and Heat.

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The Seventh is, by such a *Weake Degree* of Heat, as setteth the *Spirits* in a little Motion, but is not able, either to digest the Parts, or to Issue the *Spirits*; As is seene in *Flesh* kept in a *Roome* that is not *Coole*; Whereas in a *Coole* and *Wet Larder* it will keepe longer. And wee see, that *Vivification* (whereof *Putrefaction* is the *Bastard Brother*,) is effected by such *Soft Heats*; As the *Hatching* of *Egges*; The Heat of the *Wombe*, &c.

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The Eighth is, by the *Releasing* of the *Spirits*; which before were close kept by the *Solidnesse* of their *Coverture*, and thereby their *Appetite* of *Issuing* checked; As in the *Artificiall Rusts* induced by strong *Waters*, in *Iron*, *Lead*, &c. And therefore *Wetting* hasteneth *Rust*, or *Putrefaction* of any thing, because it softeneth the *Crust*, for the *Spirits* to come forth.

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The Ninth is, by the *Exchange* of *Heat* and *Cold*, or *Wet* and *dry*; As wee see in the *Moulding* of *Earth* in *Frosts*, and *Sunne*; And in the more hasty *Rotting* of *Wood*, that is sometimes wet, sometimes dry.

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The Tenth is, by *Time*, and the *Worke* and *Procedure* of the *Spirits* themselves, which cannot keepe their *Station*; Especially if they be left to themselves; And there be not *Agitation* or *Locall Motion*. As wee see in *Corne* not stirred; And *Mens Bodies* not exercised.

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All *Moulds* are *Inceptions* of *Putrefaction*; As the *Moulds* of *Pyes*, and *Flesh*; the *Moulds* of *Oranges*, and *Lemons*; which *Moulds* afterwards turne into *Wormes*, or more odious *Putrefactions*: And therefore (commonly) prove to be of ill *Odour*. And if the *Body* be *Liquid*, and not apt to putrifie totally, it will cast up a *Mother* in the *Top*: As the *Mothers* of *Distilled waters*.

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Mosse is a *Kinde* of *Mould*, of the *Earth*, and *Trees*. But it may be better sorted as a *Rudiment* of *Germination*; To which we referre it.

Experiments
in Confort,
touching Pro-
hibiting and
Preventing Pu-
trefaction,

It is an *Enquiry* of *Excellent use*, to *Enquire* of the *Meanes* of *Preventing* or *Staying Putrefaction*; For therein consisteth the *Meanes* of *Conservation* of *Bodies*; For *Bodies* have two *Kindes* of *Dissolutions*; The one by *Consumption*, and *Desiccation*; The other by *Putrefaction*. But as for the *Putrefactions* of

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of the Bodies of Men, and Living Creatures; (as in Agues, Wormes, Consumptions of the Lungs, Impostumes, and Ulcers both Inwards and Outwards,) they are a great Part of Physicke, and Surgery: And therefore we will reserve the Enquiry of them to the proper Place, where we shall handle Medicinall Experiments of all Sorts: Of the rest we will now Enter into an Enquiry: wherein much Light may be taken, from that which hath bene said, of the Meanes to Enduce or Accelerate Putrefaction. For the Removing that, which caused Putrefaction, doth Prevent and Avoid Putrefaction.

The First Meanes of Prohibiting or Checking Putrefaction, is Cold: For so wee see that Meat and Drinke will last longer, Vnputrified, or Vnsowred, in Winter, than in Summer: And we see that Flowers, and Fruits, put in Conservatories of Snow, keepe fresh. And this worketh by the Detention of the Spirits, and Constipation of the Tangible Parts.

The Second is Astringen: For Astringen prohibiteh Dissolution: As we see (generally) in Medicines, whereof such as are Astringen's doe inhibit Putrefaction: And by the same reason of Astringency, some small Quantitie of Oile of Vitrioll, will keepe Fresh Water long from Putrefying. And this Astringen is in a Substance that hath a Virtuall Cold: And it worketh (partly) by the same Meanes that Cold doth.

The Third is, the Excluding of the Aire: And againe, the Exposing to the Aire: For these Contraries, (as it cometh often to passe,) worke the same Effect, according to the Nature of the Subject Matter. So we see, that Beere, or Wine, in Bottles close stopped, last long: That the Garners under Ground keepe Corne longer than those above Ground; And that Fruit, closed in Wax keepeth fresh: And likewise Bodies put in Honey, and Flower, keepe more fresh: And Liqueurs, Drinckes, and Juices, with a little Oyle cast on the Top, keepe fresh. Contrariwise, we see that Cloth and Apparell, not Aired, doe breed Moathes, and Mould: And the Diversitie is, that in Bodies that need Detention of Spirits, the Exclusion of the Aire doth good: As in Drinckes, and Corne: But in Bodies that need Emission of Spirits, to discharge some of the Superfluous Moisture, it doth hurt, for they require Airing.

The fourth is Motion, and Stirring: For Putrefaction asketh Rest; For the Subull Motion, which Putrefaction requireth, is disturbed by any Agitation: And all Locall Motion keepeth Bodies Integrall, and their Parts together: As we see that Turning over of Corne in a Garner, Or Letting it runne like an Houre-glasse, from an upper Roome into a Lower, doth keepe it Sweet: And Running Waters putrefie not: And in Mens Bodies, Exercise hindreth Putrefaction: And contrariwise Rest, and Want of Motion, or Stoppings, (whereby the Runne of Humours, or the Motion of Perspiration, is stayed,) further Putrefaction: As we partly touched a little before.

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The Fifth is, the *Breathing forth of the Adventitious Moisture in Bodies*; For as *Wetting* doth hasten *Putrefaction*; So *Convenient Drying*, (whereby the more *Radical Moisture* is onely kept in,) putteth backe *Putrefaction*: So we see that *Herbs*, and *Flowers*, if they be dried in the *Shade*; Or dried in the hot *Sunne*, for a small time, keepe best. For the *Emission* of the *Loose* and *Adventitious Moisture*, doth betray the *Radical Moisture*; And carryeth it out for *Company*.

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The Sixth is, the *Strengthening of the Spirits of Bodies*; For as a *Great Heat* keepeth *Bodies* from *Putrefaction*; But a *Tepide Heat* enclineth them to *Putrefaction*: So a *Strong Spirit* likewise preserveth, and a *Weake* or *Faint Spirit* disposeth to *Corruption*. So we finde that *Salt-water* corrupteth not so soone as *Fresh*: And *Salting* of *Oysters*, and *Powdering* of *Meat*, keepeth them from *Putrefaction*. It would be tried also, whether *Chalke* put into *Water*, or *Drinke*, doth not preserve it from *Putrefying*, or speedy *Souring*. So wee see that *Strong Beere* will last longer than *Small*; And all *Things*, that are *Hot* and *Aromaticall*, doe helpe to *Preserve Liquours*, or *Powders*, &c. Which they doe, as well by *Strengthening the Spirits*, as by *Soaking out the loose Moisture*.

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The Seventh is, *Separation of the Cruder Parts*, and thereby making the *Body more Equall*; for all unperfect *Mixture* is apt to *Putrefie*; And *Warry Substances* are more apt to *Putrefie*, than *Oily*. So we see *Distilled Waters* will last longer, than *Raw waters*; And *Things* that have passed the *Fire*, doe last longer, than those that have not passed the *Fire*; As *Dried Peares*, &c.

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The Eighth is, the *Drawing forth continually of that part, where the Putrefaction beginneth*: Which is (commonly) the *Loose and warry Moisture*; Not onely for the Reason before given, that it provoketh the *Radical Moisture* to come forth with it; But because being detained in the *Body*, the *Putrefaction* taking hold of it, infecteth the rest: As we see in the *Embalming dead Bodies*: And the same Reason is of *Preserving Herbs*, or *Fruits*, or *Flowers*, in *Branne*, or *Meale*.

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The Ninth is, the *Commixture of any Thing that is more Oily, or Sweet*: For such *Bodies* are least apt to *Putrefie*, the *Aire* working little upon them; And they not *putrefying* preserve the rest. And therefore we see *Syrups*, and *Ointments*, will last longer, than *Juyces*.

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The Tenth is, the *Commixture of somewhat that is Dry*; For *Putrefaction* beginneth first from the *Spirits*; And then from the *Moisture*: And that that is dry is unapt to *putrefie*: And therefore *Smoake* preserveth *Flesh*; As wee see in *Bacon*, and *Neats-Tongues*, and *Martlemas Beefe*, &c.

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The Opinion of some of the *Ancients*, that *Blowne Aires* doe preserve *Bodies*, longer than other *Aires*, seemeth to mee Probable; For that the *Blowne Aires*, being *Over-charged* and *Compressed*, will hardly receive the *Exhaling* of any *Thing*, but rather repulse it. It was tried in a *Blowne Bladder*, whereinto *Flesh* was put, and likewise a *Flower*, and it sorted not: For *Dry Bladders* will not *Blow*: And *New Bladders* rather

ther further *Putrefaction*: The way were therefore, to blow strongly, with a Paire of Bellows, into a Hoghead, putting into the Hoghead (before) that which you would have preserved; And in the instant that you withdraw the Bellows, stop the Hole close.

THe Experiment of Wood that shineth in the Darke, we have diligently driven, and pursued: The rather, for that of all Things, that give Light here below, it is the most Durable; And hath least Apparent Motion. Fire and Flame are in continuall Expence; Sugar shineth onely while it is in Scraping; And salt-water while it is in Dashing; Glow-wormes have their Shining while they live, or a little after; Onely Scales of Fishes (Putrified) seeme to be of the same Nature with Shining Wood: And it is true, that all *Putrefaction* hath with it an Inward Motion, as well as Fire, or Light. The Triall sorted thus. 1. The Shining is in some Peeces more Bright, in some more Dimme; but the most Bright of all doth not attaine to the Light of a Glow-worme. 2. The Woods that have beene tried to shine, are chiefly Sallow, and willow; Also the Ash, and Hasle; It may be, it holdeth in others. 3. Both Roots, and Bodies doe shine, but the Roots better. 4. The Colour of the Shining Part, by Day-light, is in some Peeces White, in some Peeces inclining to Red; Which in the Countrey they call the white, and Red Garret. 5. The Part that Shineth, is, (for the most part) somewhat soft, and Moist to feele to; But some was found to be Firme and Hard; So as it might be figured into a Crosse, or into Beads, &c. But you must not looke to have an Image, or the like, in any Thing that is Lightsome; For even a face in Iron red Hot will not be seene, the Light confounding the small differences of Lightsome and Darksome, which shew the figure. 6. There was the Shining Part pared off, till you came to that, that did not Shine; But within two Dayes the Part Contiguous began also to shine, being laid abroad in the Dew; So as it seemeth the *Putrefaction* spreadeth. 7. There was other dead Wood of like kind, that was Laid abroad, which shined not at the first; But after a Nights lying abroad began to shine. 8. There was other Wood, that did First shine; And being laid dry in the House, within five or six dayes, Lost the shining; And laid abroad againe, Recovered the shining. 9. Shining Woods, being laid in a Dry Roome, within a Seven night, lost their shining; But being laid in a Cellar, or Danke Roome, kept the shining. 10. The Boring of Holes, in that kinde of Wood, and then laying it abroad, seemeth to conduce to make it shine: The Cause is, for that all solution of Continuitie doth helpe on *Putrefaction*, as was touched before. 11. No Wood hath beene yet tried to shine, that was cut downe alive, but such as was Rotted, both in Stocke, and Root, while it grew. 12. Part of the Wood that shined, was steeped in Oyle, and retained the shining a Fortnight. 13. The like succeeded in some Steeped in Water, and much better. 14. How long the Shining will continue, if the Wood be laid abroad every Night, and taken in and Sprinkled with Water in the Day, is not yet tried. 15. Triall was

Experiment
Solitary touching
Shining Wood
Shining in the
Darke.

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made of laying it abroad in Frostie weather, which hurt it not. 16. There was a great Peece of a Root which did shine, and the shining Part was Cut off, till no more Shined; Yet after two Nights, though it were kept in a drie Roome, it got a shining.

Experiment
Solitary touch-
ing the Accel-
eration of Birth.

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THe Bringing forth of living Creatures may be accelerated in two Respects: The one, if the Embryon ripeneth and perfecteth sooner: The other, if there be some Cause from the Mothers Body, of Expulsion or Putting it downe: whereof the Former is good, and argueth Strength; The Latter is ill, and cometh by Accident or Disease. And therefore the Ancient Observation is true, that the Childe borne in the Seventh Moneth, doth commonly well; But Borne in the Eighth Moneth, doth (for the most part) die. But the Cause assigned is Fabulous; Which is, that in the Eighth Moneth, should be the Returne of the Raigne, of the Planet Saturne: which (as they say) is a Planet Maligne; whereas in the Seventh is the Raigne of the Moone, which is a Planet Propitious. But the true Cause is, for that where there is so great a Prevention of the Ordinary time, it is the lastnesse of the Childe; But when it is lesse, it is some Indisposition of the Mother.

Experiment
Solitary touch-
ing the Accel-
eration of
growth and
Stature.

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TO Accelerate Growth or Stature, it must proceed; Either from the Plentie of the Nourishment, Or from the Nature of the Nourishment; Or from the Quickening and Exciting of the Naturall Heat. For the first, Excesse of Nourishment is hurtfull; For it maketh the Childe Corpulent; And Growing in Breadth, rather than in Heighth. And you may take an Experiment from Plants, which, if they spread much, are seldome tall. As for the Nature of the Nourishment; First, it may not be too Drie; And therefore Children in Dayrie Countries doe wax more tall, than where they feed more upon Bread, and Flesh. There is also a received Tale; That Boyling of Dasse Roots in Milke (which it is certaine are great Driers) will make Dogs little. But so much is true, that an Over-drie Nourishment in Child-hood putteth backe Stature. Secondly, the Nourishment must be of an Opening Nature; For that Attenuateth the Juice, and furthereth the Motion of the Spirits, upwards. Neither is it without cause, that Xenophon, in the Nouriture of the Persian Children, doth so much commend their Feeding upon Cardamon; which (he saith) made them grow better, and be of a more Active Habit. Cardamon is in Latine Nasturtium; And with us Water-Cresses; Which, it is certaine, is an Herbe, that whilest it is young, is Friendly to Life. As for the Quickening of Naturall Heat, it must be done chiefly with Exercise; And therefore (no doubt) much Going to Schoole, where they sit so much, hindereth the Growth of Children; whereas Countrey People, that goe not to Schoole, are commonly of better Stature. And againe Men must beware, how they give Children, any thing that is Cold in Operation; For even Long Sucking doth hinder both Wit, and Stature. This hath beene tryed, that a Whelp, that hath beene fed with Nitre in Milke, hath become

come very little; but extreme lively: For the spirit of Nitre is Cold, And though it be an Excellent Medicine, in Strength of yeares, for Prolongation of Life; yet it is, in Children and young Creatures, an Enemy to Growth: And all for the same Reason; For Heat is requisite to Growth: But after a Man is come to his Middle Age, Heat consumeth the Spirits; which the Coldnesse of the Spirit of Nitre doth helpe to condense, and correct.

And the Mixture of Water, Distilled; Both which have a kind of

There be two Great Families of Things; You may terme them by severall Names; Sulphureous and Mercuriall, which are the Chymists Words: (For as for their Sal, which is their Third Principle, it is a Compound of the other two; Inflam-

mable and Not Inflamable; Mature and Crude; Oily and Watry. For we see that in Subterraneities there are, as the Fathers of their Tribes, Brimstone and Mercury: In Vegetables, and Li-

ving Creatures there is Water and Oyle: In the Inferiour Order of Pneumaticalls there is Aire and Flame: And in the Superi-

our, there is the Body of the Starre, and the Pure Sky. And these Paires, though they be unlike in the Primitive Differences of

Matter, yet they seeme to have many Consents: For Mercury

and Sulphure are principall Materials of Metalls; Water and

Oyle, are principall Materials of Vegetables, and Animals; And

seeme to differ but in Maturation, or Concoction: Flame (in

Vulgar Opinion) is but Aire Incensed; And they both have

Quicknesse of Motion, and Facilitie of Cession, much alike:

And the Interstellar Sky (though the Opinion be vaine, that

the Starre is the Denser Part of his Globe, hath notwithstanding so much Affinity with the Stars, that there is a Rotation

of that, as well as of the Stars: Therefore it is one of the great

est Magnalia Naturae, to turne Water, or Watry Juyc into

Oyle or Oily Juyc; Greater in Nature, than to turne Silver

or Quick silver, into Gold: It is the Greene predominance

The Instance wee have in where the Earth and Watry Substance tur-

neeth into Fat and Oyle, are of foure kinds: First in the Distillation of Barth

and Water, which mingled by the helpe of the Sunne, gather in drops

Fatnesse, more than either of them have severally; As we see, in that

they put forth Plants, which need both Juycs: And as we see, in that

The Second is in the ripening of Nuts, made in the Bo-

dies of Plants, and Living Creatures: Whereof Nature hurne the Juyc of

meere Water and Earth, into a great deal of Oily Matter: Living Crea-

tures,

Experiments
in Consort
touching Sul-
phur and Mer-
cury, two of Pa-
vace's Principles.

Experiments
touching
the Conversion
of

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tures, though much of their *Fat*, and *Flesh*, are out of *oily Aliment*, (as *Meat*, and *Bread*;) yet they Assimilate also in a Measure their *Drinke* of *Water*, &c. But these two *Wayes* of *Version* of *Water* into *Oyle*, (namely by *Mixture*, and by *Assimilation*) are by many *Passages*, and *Percolations*, and by long *Continuance* of some *Heats*, and by *Circuits* of *Time*.

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The third is in the *Inception* of *Putrefaction*; As in *Waters Corrupted*; And the *Mothers* of *Waters Distilled*; Both which have a kinde of *Favours*, or *Oyle*.

Experiment
in Colour
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The Fourth is in the *Dulcoration* of some *Metalls*; As *Saccharum Saturni*, &c.

The *Intention* of *Version* of *Water* into a more *Oily Substance*, is by *Digestion*. For it is almost *Nothing* else but *Water Digested*; And this *Digestion* is principally by *Heat*, Which *Heat* must be either *burnt*, or *immediat*. Again, it may be by *Provocation*, or *Excitation*, Which is caused by the *Mingling* of *Bodies* already *Oily*, or *Digested*. For they will somewhat *Communicate* their *Nature* with the rest. *Digestion* also is strongly effected by direct *Assimilation*, of *Bodies Crude* into *Bodies Digested*. As in *Blacks*, and *Living Creatures*, whose *Nourishment* is far more *Crude* than their *Bodies*. But this *Digestion* is by a great *Compasse*, as hath beene said. As for the more full *Handling* of these two *Principles*, whereof this is but a *Taste*; (the *Enquiry* of which is one of the *Profoundest* *Equalities* of *Nature*;) we leave it to the *Tale* of *Version* of *Bodies*; And likewise to the *Tale* of the *First* *Congregations* of *Matter*. Which, like a *Generall Assembly* of *Estates*, doth give *Law* to all *Bodies*.

Experiment
Solitary touch-
ing *Chameleons*.

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A *Chameleon* is a *Creature* about the *Bignesse* of an *Ordinary Lizard*. His *Head* is proportionably *bigg*. His *eyes* are *large*. He *move*th his *Head* without the *writhing* of his *Necke*, (which is *inflexible*;) as a *Hogge* doth: His *Backe* *crooked*; His *Skin* *covered* with *little Tumours*, like *Emment* *hearts* of the *Belly*; His *Taile* *slender*, and *long*: On each *Foot* he hath *five Fingers*, three on the *Outside*, and two on the *Inside*; His *Tongue* of a *marvellous Length* in respect of his *Body*, and *low* at the *end*; Which he will *launch out* to *prey* upon *Flies*. Of *Col-our Greene*, and of a *dusky Yellow*, *brighter* and *whiter* towards the *Belly*; Yet *spotted* with *blew*, *White*, and *Red*. If he be laid upon *Greene*, the *Greene* *predominateth*; If upon *Yellow*, the *Yellow*; Not so if he be laid upon *blew*, or *Red*, or *White*. Only the *Greene Spots* receive a more *Orichalck* *light*: laid upon *blacke*, he looketh all *blacke*, though not without admixture of *Greene*; & he feedeth not only upon *Air*, though that be his *principall Sustenance*; For sometimes hee taketh *Flies*, as was said: Yet some that have kept *Chameleons* a *whole year* together, could never perceive that ever they fed upon any *Thing* *besides Air*: And might observe their *Bellies* to *swell* after they had *exhausted* the *Aire*, and *closed* their *Jawes*. Which they open com-

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monly against the Rayes of the Sunne. They have a foolish Tradition in *Magike*, that if a *Chameleon* be burnt upon the Top of an House, it will raise a Tempest; Supposing (according to their vaine Dreames of *Sympathies*) because hee nourisheth with Aire, his Body should have great vertue to make Impression upon the Aire.

It is reported by one of the *Ancients*, that in Part of *Media*, there are Eruptions of *Flames* out of *Plaines*; And that those *Flames* are cleare, & cast not forth such *Smoke*, and *Ashes*, and *Pumice*, as *Mountain* *Flames* doe. The Reason (no doubt) is, because the *Flame* is not pent, as it is in *Mountaines*; and *Earth quakes* which cast *Flame*. There be also some *Blinde Fires*, under *Stone*, which flame not out, but vile being powdered upon them, they flame out. The Cause whereof is, for that it seemeth, the *Fire* is so choaked, as not able to remove the *Stone*, it is *Heat*, rather than *Flame*; Which nevertheless is sufficient to Enflame the *Oyle*.

It is reported, that in some *Lakes*, the *Water* is so *Nitrous*, as if *Foule* *Cloath* be put into it, it scoureth them of it selfe: And if they stay any whit long, they moulder away. And the Scouring Vertue of *Nitre* is the more to be noted, because it is a *Body Cold*; And wee see *Warm Water* scoureth better than *Cold*. But the Cause is, for that it hath a Subtil *Spirit*, which severeth and divideth any thing that is foule, and *Viscous*; and sticketh upon a *Body*.

Take a *Bladder*, the greatest you can get; Fill it full of *Winde*, and tie it about the Necke with a *Silke* thred waxed. And upon that likewise *Wax* very close; So that when the Neck of the *Bladder* dryeth, no *Aire* may possibly get in, nor out. Then bury it three or foure foot under the *Earth*, in a *Hollow* Or in a *Concealment* of *Snow*, the *Snow* being made hollow about the *Bladder*; And after some Fortnightes distance, see whether the *Bladder* be shrunk. For if it be, then it is plaine, that the *Coldness* of the *Earth*, or *Snow*, hath Condensed the *Aire*, and brought it a Degree nearer to *Water*: Which is an Experiment of great Consequence.

It is a Report of some good credit, that in *Deepe Caves*, there are *Pearle Crystall* and *Degrees* of *Ice* that drop from above; And in some other, (though more rarely) that rise from below. Which though it be chiefly the Work of *Gold*, yet it may be, that *Water*, that passeth thorow the *Earth*, gathereth a Nature more clammy, and fitter to Congeale, and becomes *Solid*, than *Water* of it selfe. Therefore I will would be made, to lay a *Heap* of *Earth*, in great *Frosts*, upon a *Hollow Vessel*, putting a *Canvase* between, that it falleth not in: And pour *Water* upon it, in such Quantitie as will be sure to soake thorow; And see whether it will not make an harder *Ice* in the bottom of the *Vessel*, and

Experiment
Solitary, touching
Solitary
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Experiment
Solitary touching
Nitre.
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Experiment
Solitary touching
Congealing of
Aire.
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Experiment
Solitary touching
Congealing of
Water into
Crystall.
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and lesse apt to dissolve, than ordinarily. I suppose also, that if you make the Earth narrower at the bottome, than at the Top, in fashion of a Sugar Loafe Reversed, it will helpe the Experiment. For it will make the Ice, where it Issueth, lesse in Bulke; And evermore Smalnesse of Quantity is a Helpe to *Version*.

Experiment
Solitary touch-
ing Preserving
of Rose-leaves,
both in Colour,
and Smell.

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TAKE *Damaske Roses*, and pull them; Then dry them upon the Top of an House, upon a Lead or Tarras, in the hot Sun, in a cleare day, between the Houres (onely) of twelve and two; or thereabouts. Then put them into a Sweet Dry Earthen Bottle, or a Glasse, with narrow Mouthes, stuffing them close together, but without Bruising: Stop the Bottle, or Glasse, close, and these *Roses* will retaine, not onely their Smell Perfect, but their Colour fresh, for a yeare at least. Note, that Nothing doth so much destroy any Plant, or other body, either by *Putrefaction*, or *Arefaction*, as the *Adventitious Moisture*, which hangeth loose in the Body, if it bee not drawne out. For it betrayeth and rolleth forth the *Innate* and *Radicall Moisture*, along with it, when it selfe goeth forth. And therefore in *Living Creatures*, Moderate Sweat doth preserve the Juyce of the Body. Note that these *Roses*, when you take them from the Drying, have little or no Smell; So that the Smell is a Second *Smell*, that Issueth out of the Flower afterwards.

Experiments
in Confort,
touching the
Continuance of
Flame.

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THE Continuance of Flame, according unto the diversity of the Body Enflamed, & other Circumstances, is worthy the Enquiry; Chiefly, for that though Flame be (almost) of a Momentary Lasting, yet it receiveth the More, and the Lesse: we will first therefore speake (at large) of Bodies Enflamed, wholly, and Immediately, without any *Wicke* to helpe the Inflammation. A Spoonfull of Spirit of Wine, a little heated, was taken, and it burnt as long as came to 116. Pulses. The same Quantity of Spirit of Wine, Mixed with the Sixth Part of a Spoonfull of Nitre burnt but to the space of 94. Pulses. Mixed with the like Quantity of Bay-salt, 83. Pulses. Mixed with the like Quantity of Gunpowder, which dissolved into a Blacke water, 110. Pulses. A Cube, or Peller of Yellow wax, was taken, as much as halfe the Spirit of Wine, and set in the Middelt, and it burnt onely to the space of 87. Pulses. Mixed with the Sixth Part of a spoonfull of Milke, it burnt to the space of 100. Pulses; And the Milke was crudled. Mixed with the Sixth Part of a spoonfull of Water, it burnt to the space of 86. Pulses; With an Equall Quantity of Sugar, onely to the space of 4. Pulses. A small pebble was laid in the Middelt, and the Spirit of Wine burnt to the space of 94. Pulses. A Peece of Wood, of the Bignesse of an Arrow, and about a Fingers length, was set up in the Middelt, and the Spirit of Wine burnt to the space of 94. Pulses. So that the Spirit of Wine Simple, endured the longest; And the Spirit of Wine with the Bay-salt, and the Equall Quantity of Water, were the shortest.

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Consider well, whether the more speedy Going forth of the flame, be caused,

caused, by the *Greater Vigour* of the *Flame* in *Burning*; Or by the *Resistance* of the *Body mixed*, and the *Aversion* thereof to take *Flame*: Which will appeare by the *Quantitie* of the *Spirit of Wine*, that remaineth after the *Going out* of the *Flame*. And it seemeth cleerely to be the latter; For that the *Mixture* of *Things* least apt to burne, is the *Speediest* in going out. And note, by the way, that *Spirit of Wine* burned, till it goe out of it selfe, will burne no more; And tasteth nothing so hot in the Mouth, as it did; No nor yet sowre, (as if it were a degree towards *Vinegar*,) which *Burnt Wine* doth; but flat and dead.

Note, that in the *Experiment* of *Wax* aforesaid, the *Wax* dissolved in the burning, and yet did not incorporate it selfe, with the *Spirit of Wine*, to produce one *Flame*; but wheresoever the *Wax* floated, the *Flame* forsooke it, till at last it spread all over, and put the *Flame* quite out.

The *Experiments* of the *Mixtures* of the *Spirit of Wine* enflamed, are *Things* of discoverie, and not of Use: But now wee will speake of the *Continuance* of *Flames*, such as are used for *Candles*, *Lamps*, or *Tapers*; consisting of *Inflammable Matters*, and of a *wicke* that provoketh *Inflammation*. And this importeth not only *Discoverie*, but also *Use* and *Profit*; For it is a great *Saving*, in all such *Lights*, if they can be made as faire and bright as others, and yet last longer. *Wax Pure* made into a *Candle*, and *Wax Mixed* severally into *Candle-stuffe*, with the *Particulars* that follow; (*viz. Water, Aqua-vitæ, Milke, Bay-salt, Oyle, Butter, Nitre, Brimstone, Saw-dust,*) Every of these bearing a *Sixth Part* to the *wax*; And every of these *Candels Mixed*, being of the same *Weight* and *Wicke* with the *Wax Pure*, proved thus in the *Burning*, and *Lasting*. The *Swiftest* in *Consuming* was that with *Saw-dust*; Which first burned faire, till some part of the *Candle* was consumed, and the *Dust* gathered about the *Snafte*; But then it made the *Snafte* bigge, and long, and to burne duskily; and the *Candle* wasted in halfe the time of the *Wax Pure*. The next in *Swiftnesse*, were the *Oyle*, and *Butter*, which consumed, by a *Fifth part*, swifter than the *Pure Wax*. Then followed in *Swiftnesse* the *Cleare Wax* it selfe. Then the *Bay-Salt*, which lasted about an *Eighth part* longer than the *Cleare Wax*. Then followed the *Aqua-vitæ*, which lasted about a *Fifth part* longer than the *Cleare Wax*. Then followed the *Milke*, and *Water*, with little difference from the *Aqua-vitæ*, but the *Water* slowest. And in these foure last, the *Wicke* would spit forth little *Sparks*. For the *Nitre*, it would not hold lighted above some *Twelve Pulses*; But all the while it would spit out *Portions* of *Flame*, which afterwards would goe out into a vapour. For the *Brimstone*, it would hold lighted, much about the same with the *Nitre*; But then after a little while, it would harden and cake about the *Snafte*; So that the *Mixture* of *Bay-Salt* with *Wax*, will winne an *Eighth part* of the time of lasting; and the *Water* a *Fifth*.

After the *Severall Materialls* were tried, *Triall* was likewise made of *severall Wickes*; As of *Ordinary Cotton*; *Sewing Thred*; *Rush*; *Silke*; *Straw*; and *Wood*. The *Silke*, *Straw*, and *Wood*, would flame a little, till they

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they came to the *Wax*, and then goe out : of the Other Three, the *Thred* consumed faster than the *Cotten*, by a Sixth part of Time : The *Cotton* next : Then the *Rush* consumed slower than the *Cotton*, by at least a third part of time. For the Bignesse of the *Flame*, the *Cotton*, and *Thred*, cast a *Flame* much alike, and the *Rush* much lesse, and dimmer. *Quære*, whether *wood*, and *wiekes* both, as in *Torches*, consume faster, than the *Wiekes Simple*?

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Wee have spoken of the Severall *Materialls*, and the Severall *wiekes* : But to the *lasting* of the *Flame*, it importeth also ; Not only what the *Materiall* is, but in the same *Materiall*, whether it be Hard, Soft, Old, New &c. Good *Houfwives*, to make their *Candles* burne the longer, use to lay them (one by one) in *Bran*, or *Flower*, which make them harder, and so they Consume the slower : Insomuch, as by this meanes, they will out-last other *Candles*, of the same *Stuffe*, almost Halfe in Halfe. For *Bran* and *Flower* have a Vertue to Harden : So that both Age, and lying in the *Bran*, doth helpe to the *Lasting*. And wee see that *wax Candles* last longer than *Tallow Candles*, because *wax* is more firme, and hard.

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The *Lasting* of *Flame* also dependeth upon the easie *Drawing* of the *Nourishment* ; As we see in the *Court of England*, there is a Service which they call *All-night* ; which is (as it were) a great Cake of *Wax*, with the *Wieke* in the *Middest* ; whereby it commeth to passe, that the *Wieke* fetcheth the *Nourishment* further off. Wee see also that *Lamps* last longer, because the *Vessell* is farre broader, than the *Bredth* of a *Taper*, or *Candle*.

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Take a *Turreted Lampe* of *Tinne*, made in the forme of a *Squire* ; The Heighth of the *Turret* being thrice as much, as the length of the lower part, whereupon the *Lampe* standeth : Make only one Hole in it, at the Ende of the *Returne* furthest from the *Turret*. Reverse it, and fill it full of *oile*, by that Hole ; And then set it upright againe ; And put a *Wieke* in at the Hole ; And lighten it : You shall finde, that it will burne slow, and a long time. Which is caused, (as was said last before,) for that the *Flame* fetcheth the *Nourishment* a farre off. You shall finde also, that as the *Oile* wasteth, and descendeth, so the *Top* of the *Turret*, by little and little, filleth with *Aire* ; which is caused by the *Rarefaction* of the *Oile* by the *Heat*. It were worthy the *Observation*, to make a Hole, in the *Top* of the *Turret*, and to trie, when the *Oile* is almost consumed, whether the *Aire* made of the *Oile*, if you put to it a *Flame* of a *Candle*, in the letting of it forth, will Enflame. It were good also to have the *Lampe* made, not of *Tinne*, but of *Glasse*, that you may see how the *Vapour*, or *Aire* gathereth, by degrees, in the *Top*.

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A fourth Point, that importeth the *lasting* of the *Flame*, is the Closenesse of the *Aire*, wherein the *Flame* burneth. Wee see, that if *Wind* bloweth upon a *Candle*, it wasteth apace. We see also, it lasteth longer in a *Lanthorne*, than at large. And there are Traditions of *Lamps*, and *Candles*, that have burnt a very long time, in *Caves*, and *Tombes*.

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A Fifth Point, that importeth the *Lasting* of the *Flame*, is the Nature of

of the *Aire*, where the *Flame* burneth; whether it bee Hot or Cold; Moist or Drie. The *Aire*, if it be very Cold, irritateth the *Flame*, and maketh it burne more fiercely; (As Fire scorseth in Frostie weather;) And so furthereth the *Consumption*. The *Aire* once heated, (I conceive) maketh the *Flame* burne more mildly, and so helpeth the *Continuance*. The *Aire*, if it be Drie, is indifferent: The *Aire*, if it be Mist, doth in a Degree quench the *Flame*: (As wee see *Light* will goe out in the *Damp* of *Mines*;) And howsoever maketh it burne more dully: And so helpeth the *Continuance*.

Burials in *Earth* serve for *Preservation*; And for *Condensation*; And for *Induration* of *Bodies*. And if you intend *Condensation*, or *Induration*, you may burie the *Bodies* so, as *Earth* may touch them: As if you will make *Artificiall Porcellane*, &c. And the like you may doe for *Conservation*, if the *Bodies* be Hard, and Solid; As *Clay*, *Wood*, &c. But if you intend *Preservation* of *Bodies*, more Soft and Tender, then you must doe one of these two: Either you must put them in *Cases*, whereby they may not touch the *Earth*; Or else you must vault the *Earth*, whereby it may hang over them, and not touch them; For if the *Earth* touch them, it will doe more hurt, by the *Moisture*, causing them to putrifie, than good by the *virtuall Cold*, to conserve them; Except the *Earth* be very Drie, and Sandie.

An *Orenge*, *Limon*, and *Apple*, wrapt in a *Linnen Cloth*, being buried for a *Forthnights Space*, foure Foot deepe within the *Earth*, though it were in a *Moist Place*, and a *Rainie Time*, yet came forth, no wayes *Mouldie*, or *Rotten*, but were become a little harder than they were; Otherwise fresh in their *Colour*; But their *Juyce* somewhat flatted. But with the *Buriall* of a *Forthnight* more they became *Putrified*.

A *Bottle* of *Beere*, buried in like manner, as before, became more lively, better tasted, and *Clearer*, than it was. And a *Bottle* of *Wine* in like manner. A *Bottle* of *Vinegar*, so buried, came forth more lively, and more *Odoriferous*, smelling almost like a *Violet*. And after the whole *Moneths Buriall*, all the *Three* came forth, as fresh and lively, if not better, than before.

It were a profitable *Experiment*, to preserve *Orenge*s, *Limons*, and *Pomegranates*, till *Summer*; For then their *Price* will bee mightily increased. This may be done, if you put them in a *Pot* or *Vessell*, well covered, that the *Moisture* of the *Earth* come not at them; Or else by putting them in a *Conservatorie* of *Snow*. And generally, whosoever will make *Experiments* of *Cold*, let him bee provided of three Things; A *Conservatorie* of *Snow*; A good large *Vault*, twenty foot at least under the *Ground*; And a *Deepe Well*.

There hath beene a *Tradition*, that *Pearle*, and *Corall*, and *Turchois-Stone*, that have lost their *Colours*, may be recovered by *Burying* in the *Earth*: Which is a thing of great profit, if it would soe: But upon *Triall* of *Six Weekes Buriall*, there followed no *Effect*. It were good to trie it, in

Experiments
in Consort,
touching Bu-
rialls or Insu-
sions of diuers
Bodies in Earth.

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Experiment
Solitary tou-
ching the Af-
fects in Mens
Bodies from Se-
verall Winds.

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Experiment
Solitary tou-
ching Winter
and Summer
Sicknesses.

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Experiment
Solitary tou-
ching Resist-
tial Seasons.

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Experiment
Solitary tou-
ching an Er-
ror received
about Epide-
mical Diseases.

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Experiment
Solitary tou-
ching the Alte-
ration or Pre-
servation of Li-
quours in Wells,
or deepe Vaults.

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in a Deepe Well; Or in a Conservatory of Snow, where the Cold may bee more Constringent; And so make the Body more united; and thereby more Resplendent.

Mens Bodies are heavier, and lesse disposed to Motion, when Southerne Winds blow, than when Northerne. The Cause is, for that when the Southerne Wind blow, the Humours doe (in some Degree) melt, and wax fluide, and so flow into the Parts; As it is seene in wood, and other Bodies; which, when the Southerne Winds blow, doe swell. Besides, the Motion and Activity of the Body consisteth chiefly in the Sinewes, which, when the Southerne Wind bloweth, are more relax.

It is commonly seene, that more are Sick in the Summer, and more Dye in the Winter; Except it be in Pestilent Diseases, which commonly raigne in Summer, or Autumne. The Reason is, because Diseases are bred (indeed) chiefly by Heat; But when they are Cured must by Sweat, and Surge, which in the Summer commeth on, or is provoked, more Easily: As for Pestilent Diseases, the Reason why most Dye of them in Summer, is because they are bred most in the Summer; For otherwise those that are touched are in most Danger in the Winter.

The Generall Opinion is, that Teares Hot and Moist, are most Pestilent; Upon the Superficiall Ground, that Heat and Moisture cause Putrefaction. In England it is found not true; For, many times, there have beene great Plagues in Dry Teares. Whereof the Cause may be, for that Draught in the Bodies of Islanders, habituate to Moist aires, doth Exasperate the Humours, and maketh them more apt to Putrifie, or Enflame: Besides, it tainteth the Waters (commonly,) and maketh them lesse wholesome. And againe in Barbary, the Plagues breake up in the Summer months, when the Weather is Hot and Dry, better suited, I will say, to the Nature of the Country.

Any Diseases, (both Epidemicall, and others,) breake forth at particular times. And the Cause is falsely imputed to the Constitution of the Aire, at that time, when they breake forth, or raigne; whereas it proceedeth (indeed) from a Precedent Sequence, and Series of the Seasons of the Year: And therefore Hippocrates, in his Prognosticks, doth make good Observations, of the Diseases, that ensue upon the Nature, of the Precedent four Seasons of the Year.

TRiall hath beene made, with Earthen Bottles well stopped, hanged in a Well of Twenty Fathome deepe, at the least; And some of the Bottles have beene let downe into the Water, some others have hanged above, within about a fathome of the Water; And the Liquours so tried have beene, Beere, (not New, but Ready for drinking,) and Wine, and Milke. The Proove hath beene, that both the Beere, and the Wine, (as well within Water, as above,) have not beene palled or dead'd at all; But

as good, or somewhat better, than *Bottles* of the same *Drinks*, and *Staleness*, kept in a *Cellar*. But those which did hang above *Water*, were apparently the best; And that *Beere* did flower a little; whereas that under *Water* did not, though it were *Fresh*. The *Milke* flowered, and began to *Putrifie*. Nevertheless it is true, that there is a *Village* neare *Blois*, where in *Deepe Caves* they doe thicken *Milke*; In such sort, that it becommeth very pleasant; Which was some *Cause* of this *Trial* of Hanging *Milke* in the *well*: But our prooffe was naught; neither doe I know, whether that *Milke* in those *Caves*, be first boyled. It were good therefore to try it with *Milke* Soddin, and with *Creame*; For that *Milke* of it selfe is such a *Compound Body*, of *Creame*, *Curds*, and *Whey*, as it is easily *Turned*, and *Dissolved*. It were good also to try the *Beere*, when it is in *Wort*, that it may be seene, whether the *Hanging* in the *Well*, will *Accelerate* the *Ripening* and *Clarifying* of it.

DIvers, wee see, doe *stut*. The *Cause* may bee, (in most,) the *Refri-geration* of the *Tongue*; Whereby it is lesse apt to move. And therefore we see, that *Naturalls* doe generally *stut*: And we see that in those that *stut*, if they drinke *Wine* moderately, they *stut* lesse, because it heateth: And so we see, that they that *stut*, doe *stut* more in the first *Offer* to speake, than in *Continuance*; Because the *Tongue* is, by *Motion*, somewhat heated. In some also, it may be, (though rarely,) the *Driness* of the *Tongue*; which likewise maketh it lesse apt to move, as well as *Cold*. For it is an *Affect* that it cometh to some *Wise* and *Great Men*; As it did unto *Moses*, who was *Linguae prapedita*; And many *Stutters* (wee finde) are very *Cholericke Men*; *Choler* Enducing a *Driness* in the *Tongue*.

Experiment
Solitary, tou-
ching *Stuttering*.
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Smelles, and other *Odours*, are *Sweeter* in the *Aire*, at some *Distance*, than neare the *Nose*; As hath beene partly touched heretofore. The *Cause* is double: First the finer *Mixture*, or *Incorporation* of the *Smell*: For wee see that in *Sounds* likewise, they are *Sweetest*, when we cannot heare every *Part* by it selfe. The other *Reason* is, for that all *Sweet Smells* have joyned with them, some *Earthy* or *Crude Odours*; And at some distance the *Sweet*, which is the more *Spiritual*, is *Perceived*; And the *Earthy* reacheth not so farre.

Experiments
in Consort,
touching
Smells.
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Sweet Smells are most forcible, in *Dry Substances*, when they are *Broken*; And so likewise in *Orenges*, or *Lemons*, the *Nipping* of their *Rinde*, giveth out their *smell* more: And generally, when *Bodies* are *Moved* or *Stirred*, though not *Broken*, they *smell* more; As a *Sweet-Bagge* waved. The *Cause* is double: The one, for that there is a *Greater Emission* of the *Spirit*, when *Way* is made: And this holdeth in the *Breaking*, *Nipping*, or *Crushing*; It holdeth also, (in some degree) in the *Moving*: But in this last, there is a *Concurrence* of the *Second Cause*; Which is the *Impulsion* of the *Aire*, that bringeth the *Sent* faster upon us.

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The daintiest *Smells* of *Flowers*, are out of those *Plants*, whose *Leaves*
L smell

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smell not; As *Violets*, *Roses*, *Wall-flowers*, *Gilly-flowers*, *Pincks*, *Wood-bines*, *Vine-flowers*, *Apple-Bloomes*, *Lime-Tree Bloomes*, *Beane-Bloomes*, &c. The Cause is, for that where there is Heat and strength enough in the Plant, to make the *Leaves Odorate*, there the *Smell* of the *Flower* is rather *Evanide* and *Weaker*, than that of the *Leaves*; As it is in *Rose-Mary-Flowers*, *Lavender-Flowers*, and *Sweet-Briar-Roses*. But where there is lesse Heat, there the *Spirit* of the Plant, is digested and refined, and severed from the *Grosser Juyc*, in the *Efflorescence*, and not before.

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Most *Odours* smell best, *Broken* or *Crusht*, as hath beene said; But *Flowers Pressed* or *Beaten*, doe leese the *Freshnesse* and *Sweetnesse* of their *Odour*. The Cause is, for that when they are *Crushed*, the *Grosser* and more *Earthy spirit* commeth out with the *Finer*, and troubleth it; Whereas in stronger *Odours* there are no such *Degrees* of the Issue of the *Smell*.

Experiments
in Consort,
touching the
Goodnesse and
Choice of Water.

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It is a Thing of very good Use, to Discover the *Goodnesse* of *Waters*. The *Taste*, to those that *Drinke Water* only, doth somewhat: But other *Experiments* are more sure. First, try *Waters* by *Weight*; Wherein you may finde some difference, though not much: And the *Lighter* you may account the *Better*.

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Secondly, try them by *Boyling* upon an *Equall Fire*: And that which consumeth away fastest, you may account the *Best*.

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Thirdly, try them in *Severall Bottles*, or *Open Vessells*, *Matches* in every Thing else, and see which of them *Last Longest*, without *Stench*, or *Corruption*. And that which holdeth *Unpurified* longest, you may likewise account the *Best*.

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Fourthly, try them by *Making Drinckes* Stronger, or Smaller, with the same *Quantity* of *Mault*; And you may conclude, that that *Water*, which maketh the *Stronger Drinke*, is the more *Concocted*, and *Nourishing*; though perhaps it bee not so good for *Medicinall use*. And such *Water* (commonly) is the *Water of Large* and *Navigable Rivers*: And likewise in *Large* and *Cleane Ponds* of *Standing water*: For upon both them, the *Sunne* hath more power, than upon *Fountaines*, or *Small Rivers*. And I conceive that *Chalke-water* is next them the best, for going furthest in *Drinke*: For that also helpeth *Concoction*; So it bee out of a *Deepe Well*; For then it Cureth the *Rawnesse* of the *Water*; But *Chalkie water*, towards the *Top* of the *Earth*, is too fretting; As it appeareth in *Laundry* of *Cloaths*, which weare out apace, if you use such *Waters*.

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Fifthly, the *Houswives* doe finde a *Difference* in *Waters*, for the *Bearing*, or *Not Bearing* of *Soape*: And it is likely that the more *Fat Water* will beare *Soape* best; For the *Hungry water* doth kill the *Unctuous Nature* of the *Soape*.

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Sixthly, you may make a *Judgement* of *Waters*, according to the *Place*, whence they *Spring*, or *Come*: The *Raine-water* is, by the *Physicians* esteemed the *Finest*, and the best; But yet it is said to putrifie soonest; which is likely, because of the *Finenesse* of the *Spirit*: And in *Con-*

servatories

servatories of Raine-water, (such as they have in *Venice*, &c.) they are found not so Choice *waters*; The worse, (perhaps,) because they are Covered aloft, and kept from the Sunne. *Snow-water* is held unwhole- some; In so much as the People, that dwell at the Foot of the *Snow- Mountains*, or otherwise upon the Ascent, (especially the Women,) by drinking of *Snow-water*, have great Bagges hanging under their Throats. *well-water*, except it bee upon *Chalke*, or a very plentiful Spring, maketh Meat Red; which is an ill Signe. *Springs* on the *Tops* of *High-Hills* are the best: For both they seeme to have a Lightnesse, and Appetite of Mounting; And besides they are most pure and Un- mingled; And againe are more Percolated thorow a great Space of Earth. For *Waters* in *Valleyes*, joyne in effect under Ground with all *Waters* of the same Levell; Whereas *Springs*, on the *Tops* of *Hills*, passe thorow a great deale of Pure *Earth*, with lesse Mixture of other *Waters*.

Seventhly, Judgement may bee made of *Waters* by the *Soyle* where- upon the *Water* runneth; As *Pebble* is the Cleanest, and best tasted; And next to that *Clay-water*; And Thirdly, *Water* upon *Chalke*; Fourth- ly that upon *Sand*; And Worst of all upon *Mudde*. Neither may you trust *Waters* that Taste Sweet; For they are commonly found in Ri- sing Grounds of great *Cities*; which must needs take in a great deale of Filth.

IN *Peru*, and divers Parts of the *West Indies*, though under the *Line*, the *Heats* are not so Intolerable, as they be in *Barbary*, and the Skirts of the *Torrid Zone*. The *Causes* are, First the Great *Brizes*, which the Motion of the Aire in great Circles, (such as are under the *Gir- dle* of the *World*,) produceth; Which doe refrigerate; And there- fore in those Parts Noone is nothing so hot, when the *Brizes* are great, as about Nine or Ten of the Clocke in the Fore-Noone. Another *Cause* is, for that the Length of the Night, and the Dewes thereof, doe compensate the *Heat* of the Day. A third *Cause* is the Stay of the Sunne; Not in Respect of Day and Night, (for that wee spake of before,) but in Respect of the Season; For under the *Line*, the Sunne crosse h the *Line*, and maketh two Summers, and two Winters; But in the Skirts of the *Torrid Zone*, it doubleth, and goeth backe againe, and so maketh one Long Summer.

THE *Heat* of the *Sunne* maketh *Men Blacke* in some Countries, as in *Aethiopia*, and *Ginny*, &c. *Fire* doth it not, as we see in *Glasfe- Men*, that are continually about the *Fire*. The *Reason* may bee, be- cause *Fire* doth licke up the *Spirits*, and Bloud of the Body, so as they Exhale; So that it ever maketh *Men* looke Pale, and Sallow; But the *Sunne*, which is a Gentler Heat, doth but draw the Bloud

Experiment
Solitary tou-
ching the Tem-
perate Heat un-
der the *Aqui-
noct.* all.

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Experiment
Solitary, tou-
ching the Colo-
ration of Blacke
and Tawney
Moorcs.

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to the Outward *Parts*; And rather Concocteth it, than Soaketh it: And therefore wee see that all *Aethiops* are Flefhy, and Plumpe, and have great Lips; All which betoken *Moifture* retained, and not drawne out. Wee fee alfo, that the *Negroes* are breed in Countries that have plenty of *water*, by *Rivers*, or otherwise: For *Meræ*, which was the *Metropolis* of *Aethiopia*, was upon a great Lake: And *Congo*, where the *Negroes* are, is full of *Rivers*. And the Confines of the River *Niger*, where the *Negroes* alfo are, are well watered: And the Region about *Capo Verde*, is likewise *Moift*, in fo much as it is pestilent through *Moifture*: But the Countries of the *Abyffenes*, and *Barbary*, and *Peru*, where they are Tawney, and Olivafter, and Pale, are generally more Sandy, and Dry. As for the *Aethiopes*, as they are Plumpe, and Flefhy; So (it may bee) they are Sanguine, and ruddy Coloured, if their blacke Skinne would fuffer it to be feene.

Experiment
Solitary touching Motion
after the In-
stant of Death.

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SOME *Creatures* doe move a good while after their Head is off; As *Birds*; Some a very little time; As *Men*, and all beafte; Some move, though cut in feveral Pieces; As *Snakes*, *Eeles*, *Wormes*, *Flies*, &c. First therefore it is certaine, that the *Immediate Cause* of *Death*, is the *Resolution* or *Extinguifhment* of the *Spirits*; And that the *Destruction* or *Corruption* of the *Organs*, is but the *Mediate Cause*. But some *Organs* are fo peremptorily neceffary, that the *Extinguifhment* of the *Spirits* doth speedily follow; But yet fo, as there is an *Interim* of a Small Time. It is reported by one of the *Ancients*, of credit, that a *Sacrificed Beafte* hath lowed, after the Heart hath beene feuered; And it is a Report alfo of Credit, that the Head of a *Pigge* hath beene opened, and the Braine put into the Palme of a Mans hand, trembling, without breaking any part of it, or fevering it from the Marrow of the Back-bone; During which time the *Pigge* hath beene, in all appearance, ftarke dead, and without Motion; And after a small Time the Braine hath beene replaced, and the Skull of the *Pigge* closed, and the *Pigge* hath a little after gone about. And certaine it is, that an *Eye* upon *Revenge* hath beene thruft forth, fo as it hanged a pretty diftance by the *Visual Nerve*; And during that time the *Eye* hath beene without any Power of *Sight*; And yet after (being replaced) recovered *Sight*. Now the *Spirits* are chiefly in the *Head*, and *Cells* of the *Braine*, which in *Men*, and *Beafte* are Large; And therefore, when the Head is off, they move little or nothing. But *Birds* have small Heads, and therefore the *Spirits* are a little more difperfed in the *Sinewes*, whereby Motion remaineth in them a little longer; In fo much as it is Extant in Story, that an *Emperour* of *Rome*, to fhew the Certainty of his Hand, did Shoote a great Forked Arrow at an *Eftrich*, as fhee ranne fwiftly upon the Stage, and ftrooke off her Head; And

And yet shee continued the Race, a little way, with the Head off.
 As for *Wormes*, and *Flies*, and *Eeles*, the *Spirits* are diffused al-
 most all over; And therefore they move in
 their Severall Pieces.

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NATV-

And yet he continued the Race, a little way, with the Head off.
 As for Women, and Fish, and Fowl, the Spirit are divided al-
 most all over; And therefore they move in
 their severall Pieces.

WATV



NATVRALL HISTORIE.

V. Century.



E will now enquire of *Plants* or *Vegetables*: And wee shall doe it with diligence. They are the principall Part of the *Third Dayes Worke*. They are the first *Producat*, which is the Word of *Animation*: For the other Words are but the Words of *Essence*; And they are of excellent and generall Vse, for Food, Medicine, and a Number of Mechanicall Arts.

There were sown in a *Bed*, *Turnip-Seed*, *Radish-Seed*, *Wheat*, *Cucumber-Seed*, and *Pease*. The *Bed* wee call a *Hot-Bed*, and the Manner of it is this. There was taken *Horse-dung*, old, and well rotted; This was laid upon a Banke, halfe a foot high, and supported round about with Planks; And upon the Top was cast Sifted Earth, some two Fingers deepe; And then the *Seed* sprinkled upon it, having beene steeped all night in *Water* Mixed with *Cow-dung*. The *Turnip-Seed*, and the *Wheat* came up halfe an Inch above Ground, within two dayes after, without any Watring. The Rest the third day. The *Experiment* was made in *October*; And (it may be) in the *Spring*, the *Accelerating* would have beene the speedier. This is a Noble *Experiment*; For without this helpe, they would have beene

Experiment
in Consort,
touching the
Acceleration of
Germination.

beene foure times as long in coming up. But there doth not occurre to me, at this present, any use thereof, for profit; Except it should be for Sowing of Pease, which have their Price very much increased, by the early Comming. It may be tried also with *Cherries*, *Strawberries*, and other Fruit, which are dearest, when they come early.

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There was *Wheat*, steeped in *Water* mixed with *Cow-Dung*; Other in *Water* mixed with *Horse-Dung*; Other in *Water* mixed with *Pigeon-Dung*; Other in *Urine* of *Man*; Other in *Water* mixed with *Chalke* powdered; Other in *Water* mixed with *Soot*; Other in *Water* mixed with *Asbes*; Other in *Water* mixed with *Bay-salt*; Other in *Claret Wine*; Other in *Malmsey*; Other in *Spirit of Wine*. The Proportion of the Mixture was, a fourth Part of the Ingredients to the *Water*; Save that there was not of the *Salt* above an eighth Part. The *Urine*, and *Wines*, and *Spirit of Wine*, were Simple without Mixture of *Water*. The Time of the Steeping was twelve houres. The Time of the Yeare *October*. There was also other *Wheat* sown unsteeped, but watered twice a day with warme water. There was also other *Wheat* sown simple to compare it with the rest. The Event was; That those that were in the Mixture of *Dung*, and *Urine*, and *Soot*, *Chalke*, *Asbes*, and *Salt*, came up within six daves: And those that afterwards proved the Highest, Thickest, and most Lustie, were; First the *Urine*; And then the *Dungs*; Next the *Chalke*; Next the *Soot*; Next the *Asbes*; Next the *Salt*; Next the *Wheat* Simple of it selfe, unsteeped, and unwatered; Next the *Watered* twice a day with warme water; Next the *Claret Wine*. So that these three last were slower than the ordinary *Wheat* of it selfe; And this Culture did rather retard, than advance. As for those that were steeped in *Malmsey*, and *Spirit of Wine*, they came not up at all. This is a Rich Experiment for Profit; For the most of the Steepings are Cheape Things; And the goodnesse of the Crop is a great Matter of Gaine; If the Goodnesse of the Crop answer the Earlinesse of the Comming up: As it is like it will; Both being from the vigour of the seed; Which also partly appeared in the Former Experiments, as hath beene said. This Experiment would be tried in other Graines, Seeds, and Kernells: For it may bee some Steeping will agree best with some Seeds. It would bee tried also with *Roots* steeped as before, but for longer time. It would bee tried also in *Severall* Seasons of the Yeere, especially the *Spring*.

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Strawberries watered now and then, (as once in three dayes,) with *Water*, wherein hath beene steeped *Sheepes-dung*, or *Pigeons-dung*, will prevent and come early. And it is like, the same Effect would follow in other *Berries*, *Herbs*, *Flowers*, *Graines*, or *Trees*. And therefore it is an Experiment, though vulgar in *Strawberries*, yet not brought into use generally: For it is usuall to helpe the Ground with Mucke; And likewise to Recomfort it sometimes with Mucke put to the Roots; But to water it with *Mucke water*, which is like to be more Forcible, is not practised.

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Dung, or *Chalke*, or *Bloud*, applied in Substance, (seasonably,) to the Roots

Roots of Trees, doth set them forwards. But to doe it unto *Herbs*, without Mixture of *Water* or *Earth*, it may bee these Helpes are too Hot.

The former *Meanes* of Helping *Germination*, are either by the *Goodnesse* and *Strength* of the *Nourishment*; Or by the *Comforting*, and *Exciting* the *Spirits* in the *Plant*, to draw the *Nourishment* better. And of this latter kinde, concerning the *Comforting* of the *Spirits* of the *Plant*, are also the experiments that follow; though they bee not Applications to the *Root*, or *Seed*. The *Planting* of *Trees* warme upon a *Wall*, against the *South*, or *South-East* *Sunne*, doth hasten their *Commings on*, and *Ripening*; And the *South-East* is found to bee better than the *South-West*, though the *South-West* bee the *Hotter Coast*. But the cause is chiefly, for that the *Heat* of the *Morning* succedeth the *Cold* of the *Night*: and partly, because (many times) the *South-West* *Sunne* is too *Parching*. So likewise the *Planting* of them upon the *Backe* of a *Chimney*, where a *Fire* is kept, doth hasten their *Commings on*, and *Ripening*: Nay more, the *Drawing* of the *Boughes* into the *Inside* of a *Roome*, where a *Fire* is continually kept, worketh the same Effect; Which hath beene tried with *Grapes*; In so much as they will come a *Moneth* earlier, than the *Grapes* abroad.

Besides the two *Meanes* of *Accelerating Germination*, formerly described; That is to say, the *Mending* of the *Nourishment*; and *Comforting* of the *Spirit* of the *Plant*; there is a *Third*; Which is the *Making way* for the *Easie Commings* to the *Nourishment*, and *Drawing* it. And therefore *Gentle Digging* and *Loosening* of the *Earth* about the *Roots* of *Trees*; And the *Removing* *Herbes* and *Flowers* into new *Earth*, once in two yeares, (which is the same thing; For the new *Earth* is ever looser,) doth greatly further the *Prospering*, and *Earlinesse* of *Plants*.

But the most admirable *Acceleration* by *Facilitating* the *Nourishment*, is that of *Water*. For a *Standard* of a *Damaske Rose* with the *Root* on, was set in a *Chamber*, where no *Fire* was, upright in an *Earthen Pan*, full of *Faire Water*, without any Mixture, halfe a foot under the *Water*, the *Standard* being more than two foot high above the *Water*: Within the Space of ten dayes, the *Standard* did put forth a faire *Greene* leafe, and some other little *Buds*, which stood at a stay, without any *Shew* of decay or withering, more than seven *Daies*. But afterwards that *Leafe* faded, but the young *Buds* did sprout on; which after ward opened into faire *Leaves*, in the space of three *Moneths*; And continued so a while after, till upon *Removall* wee left the *Triall*. But note that the *Leaves* were somewhat paler, and lighter-coloured, than the *Leaves* use to bee abroad. Note that the first *Buds* were in the *End* of *October*; And it is likely that if it had beene in the *Spring* time, it would have put forth with greater strength, and (it may bee) to have growne on to beare *Flowers*. By this *Meanes*, you may have, (as it seemeth,) *Roses* set in the midst of a *Poole*, being supported with some stay; Which is *Matter* of *Rarenesse* and *Pleasure*, though of small Use. This is the more strange,

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strange, for that the like *Rose-standard* was put, at the same time, into *Water* mixed with *Horse-dung*, the *Horse-dung* about the fourth Part to the *Water*, and in foure Moneths space (while it was observed) put not forth any *Leafe*, though divers *Buds* at the first, as the other.

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A *Dutch Flower*, that had a *Bulbous Root*, was likewise put, at the same time, all under *Water*, some two or three Fingers deepe; And within seven dayes sprouted, and continued long after, further Growing. There were also put in, a *Beet-Root*, a *Borrage-Root*, and a *Raddish-Root*, which had all their *Leaves* cut almost close to the *Roots*; And within six weekes had faire *Leaves*; And so continued, till the end of *November*.

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Note that if *Roots*, or *Pease*, or *Flowers*, may bee Accelerated in their Comming and Ripening, there is a double Profit; The one in the high Price that those Things beare when they come early: The other in the Swiftnesse of their Returns: For in some Grounds which are strong, you shall have a *Raddish*, &c. come in a Month; That in other Grounds will not come in two; And so make double Returns.

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Wheat also was put into the *Water*, and came not forth at all; So as it seemeth there must be some Strength and Bulke in the Body, put into the *Water* as it is in *Roots*; For *Graines*, or *Seeds*, the Cold of the *Water* will mortifie. But casually some *Wheat* lay under the Pan, which was somewhat moistned by the Suing of the Pan; which in six weekes (as aforesaid) looked mouldy to the Eye, but it was sprouted forth halfe a Fingers length.

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It seemeth by these Instances of *Water*, that for Nourishment, the *Water*, is almost all in all, and that the *Earth* doth but keepe the *Plant* upright, and save it from Over-heat, and Over-cold; And therefore is a Comfortable Experiment for good Drinkers. It proveth also that our former Opinion; That Drinke incorporate with Flesh, or *Roots*, (as in *Capon-Beere*, &c.) will nourish more easily, than Meat and Drinke taken severally.

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The Housing of *Plants* (I conceive) will both Accelerate Germination, and bring forth *Flowers* and *Plants* in the Colder seasons: And as wee House Hot Countrey *Plants*, as *Lemons*, *Oranges*, *Myrtles*, to save them; So wee may House our owne Countrey *Plants*, to forward them, and make them come in the Cold Seasons; In such sort, that you may have *Violets*, *Strawberries*, *Pease*, all Winter: So that you sow, or remove them at fit times. This Experiment is to be referred unto the Comforting of the Spirit of the *Plant*, by Warmth, as well as Housing their Boughes, &c. So then the Meanes, to Accelerate Germination, are in Particular eight, in Generall three.

Experiments
in Consort,
touching the
Putt ng backe
or Retardation
of Germination.

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TO make *Roses*, or other *Flowers* come late, it is an Experiment of Pleasure. For the Ancients esteemed much of *Rosa Sera*. And indeed the *November-Rose* is the sweetest, having beene lesse exhaled by the Sunne. The Meanes are these. First, the Cutting off their Tops, immediately after they have done Bearing; And then they will come againe the

the same yeare about *November*; But they will not come just on the Tops, where they were cut, but out of those Shoots, which were, (as it were,) *water-Boughes*. The Cause is, for that the Sap, which otherwise would have fed the Top, (though after Bearing,) will, by the discharge of that, divert unto the Side-Sprouts; And they will come to beare, but later.

The Second is the *Pulling off the Buds of the Rose*, when they are Newly knotted; For then the Side-Branches will beare. The Cause is the same with the former: For *Cutting off the Tops*, and *Pulling off the Buds*, worke the same Effect, in Retention of the Sap for a time, and Diversion of it to the Sprouts, that were not so forward.

The Third is the *Cutting off some few of the Top Boughes* in the *Spring-time*, but suffering the lower Boughes to grow on. The Cause is, for that the Boughes doe helpe to draw up the Sap more strongly; And we see that in *Powling of Trees*, many doe use to leave a Bough or two on the Top, to helpe to draw up the Sap. And it is reported also, that if you graft upon the Bough of a Tree, and cut off some of the old Boughes, the new Cions will perish.

The Fourth is by *Laying the Roots bare about Christmas*, some dayes. The Cause is plaine, for that it doth arrest the Sap, from going upwards, for a time; Which Arrest is afterwards released by the Covering of the Root againe with Earth; And then the Sap getteth up, but later.

The Fifth is the *Removing of the Tree*, some Moneth before it *Buddeth*. The Cause is, for that some time will be required after the *Remove*, for the Resetling, before it can draw the Juyce; And that time being lost, the Blossome must needs come forth later.

The Sixth is the *Grafting of Roses in May*, which commonly Gardiners doe not till *Iuly*; And then they beare not till the Next Yeare; But if you graft them in *May*, they will beare the same yeare, but late.

The Seventh is, the *Girdling of the Body of the Tree* about with some Pack-thread; For that also, in a degree, restraineth the Sap, and maketh it come up, more late, and more Slowly.

The Eighth is, the *Planting of them in a Shade*, or in a *Hedge*; The Cause is, partly the Keeping out of the Sunne, which hasteneth the Sap to rise; And partly the Robbing of them of Nourishment, by the Stuffle in the *Hedge*. These Meanes may be practised upon other, both Trees, and Flowers, *Mutatis Mutandis*.

Men have entertained a Conceit that sheweth prettily; Namely, that if you graft a *Late-Coming Fruit* upon a Stocke of a *Fruit-tree* that *Commeth early*, the Graft will beare *Fruit Early*; As a Peach upon a *Cherry*; And contrariwise, if an *Early-Coming-Fruit* upon a Stocke of a *Fruit-Tree* that *Commeth late*, the Graft will beare *Fruit late*; As a *Cherry* upon a *Peach*. But these are but Imaginations, and untrue. The Cause is, for that the Cions overruleth the Stocke quite; And the Stocke is but Passive onely, and giveth Aliment, but no Motion to the Graft.

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Experiments
in Consort,
touching the
Melioration of
Fruits, Trees,
and Plants.

Wee will speake now, how to make *Fruits, Flowers,* and *Roots* larger; in more plenty; and sweeter; than they use to be; And how to make the *Trees* themselves, more Tall; more Spread; and more Hasty and Sudden; than they use to bee. Wherein there is no doubt, but the former *Experiments* of *Acceleration*, will serve much to these Purposes. And againe, that these *Experiments*, which we shall now set downe, doe serve also for *Acceleration*; because both Effects proceed from the Encrease of vigour in the Tree; But yet to avoid Confusion; And because some of the Meanes are more proper for the one Effect, and some for the other, wee will handle them apart.

It is an assured Experience, that an *Heape* of *Flint*, or *Stone*, laid about the *Bottom* of a *Wilde-Tree*, (as an *Oake, Elme, Ash, &c.*) upon the first Planting, doth make it prosper double as much, as without it. The Cause is, for that it retaineth the Moisture, which falleth at any time upon the *Tree*, and suffereth it not to be exhaled by the Sunne. Againe, it keepeth the *Tree* warme, from Cold Blasts and Frosts, as it were in an House. It may be also, there is somewhat in the Keeping of it steady at the first. *Quare*, if Laying of Straw some Height about the Body of a *Tree*, will not make the *Tree* forwards. For though the Root giveth the Sap, yet it is the Body that draweth it. But you must note, that if you lay *Stones* about the stalke of *Lettuce*, or other Plants, that are more soft, it will over-Moisten the Roots, so as the Wormes will eat them.

A *Tree*, at the first Setting, should not bee *Shaken*, untill it hath taken Root fully: And therefore some have put two little Forkes about the Bottom of their *Trees*, to keepe them upright; But after a yeares Rooting, then Shaking doth the *Tree* good, by Loosening of the Earth, and (perhaps) by Exercising (as it were) and Stirring the Sap of the *Tree*.

Generally, the Cutting away of *Boughes* and *Suckers* at the Root and Body, doth make *Trees* grow high; And contrariwise, the *Powling* and Cutting of the Top, maketh them grow spread, and bushy. As wee see in *Pollards, &c.*

It is reported, that to make hasty Growing *Coppice-Woods*, the way is, to take *Willow, Sallow, Poplar, Alder*, of some seven yeares growth; And to set them, not upright, but a slope, a reasonable depth under the Ground; And then, in stead of one Root, they will put forth many, and so carry more Shoots upon a Stemme.

When you would have many new Roots of *Fruit-trees*, take a Low *Tree*, and bow it, and lay all his Branches a-flat upon the Ground, and cast Earth upon them; And every Twigge will take Root. And this is a very profitable Experiment for Costly *Trees*; (for the Boughes will make Stockes

Stocks without charge ;) Such as are *Apricots, Peaches, Almonds, Cornelians, Mulberries, Figs, &c.* The like is continually practised with *Vines, Roses, Muske-Roses, &c.*

From *May* to *July* you may take off the *Barke* of any *Bough*, being of the Bignesse of three or foure Inches, and cover the bare Place, somewhat above, and below, with Loame well tempered with Horse-dung, binding it fast downe. Then cut off the *Bough* about *Alhallontide* in the bare place, and set it in the Ground ; And it will grow to be a faire *Tree* in one Yeare. The *Cause* may be, for that the *Baring* from the *Barke* keepeth the *Sap* from descending towards Winter, and so holdeth it in the *Bough* ; And it may be also that the Loame and Horse-Dung applied to the bare place, doe moisten it, and cherish it, and make it more apt to put forth the Root. Note, that this may be a generall Meanes for keeping up the *Sap* of *Trees* in their *Boughes* ; Which may serve to other Effects.

It hath beene practised in *Trees*, that shew faire, and beare not, to *Bore a Hole* thorow the *Heart* of the *Tree*, and thereupon it will beare. Which may be for that the *Tree* before had too much *Repletion*, and was oppressed with his owne *Sap* ; For *Repletion* is an *Enemie* to *Generation*.

It hath beene practised in *Trees*, that doe not beare, to cleave two or three of the Chiefe Roots, and to put into the Cleft a small Pebble, which may keepe it open, and then it will beare. The *Cause* may be, for that a Root of a *Tree* may be (as it were,) *Hide-bound*, no lesse than the Body of the *Tree* ; but it will not keepe open without somewhat put into it.

It is usually practised, to set *Trees* that require much *Sunne*, upon *Walls* against the *South* ; As *Apricots, Peaches, Plums, Vines, Figs*, and the like. It hath a double *Commoditie* ; The one, the *Heat* of the *Wall* by *Reflexion* ; The other, the *Taking away* of the *Shade* ; For when a *Tree* groweth round, the upper *Boughes* over-shadow the lower ; But when it is spread upon a *Wall*, the *Sunne* commeth alike, upon the upper, and lower *Branches*.

It hath also beene practised (by some) to pull off some *Leaves* from the *Trees* so spread, that the *Sunne* may come upon the *Bough* and *Fruit* the better. There hath beene practised also a *Curiositie*, to set a *Tree* upon the *North-Side* of a *Wall*, and at a little height, to draw him thorow the *Wall*, and spread him upon the *South-Side* : Conceiving that the Root and lower Part of the *Stocke* should enjoy the *Freshnesse* of the *Shade* ; And the Upper *Boughes*, and *Fruit*, the *Comfort* of the *Sunne*. But it sorted not ; The *Cause* is, for that the *Root* requireth some *Comfort* from the *Sunne*, though under *Earth*, as well as the *Bodie* : And the Lower Part of the *Bodie* more than the Upper, as wee see in *Compassing a Tree* below with straw.

The *Lownesse* of the *Bough*, where the *Fruit* commeth, maketh the *Fruit* greater, and to ripen better ; For you shall ever see in *Apricots, Peaches,*

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Peaches, or *Melo-Cotones*, upon a wall, the greatest Fruits towards the Bottome. And in *France* the *Grapes* that make the *Wine*, grow upon low Vines, bound to small Stakes. And the raised Vines in Arbours make but Verjuice. It is true, that in *Italy*, and other *Countries*, where they have hotter Sunne, they raise them upon *Elmes*, and Trees; But I conceive, that if the *French* Manner of Planting low, were brought in use there, their *Wines* would be stronger and sweeter. But it is more chargeable in respect of the Props. It were good to trie whether a *Tree* grafted somewhat neare the Ground, and the lower boughes onely maintained, and the higher continually pruned off, would not make a larger Fruit.

433

To have Fruit in Greater Plentie, the way is, to graft, not onely upon young *Stockes*, but upon divers *Boughes* of an old *Tree*; for they will beare great Numbers of Fruit; Whereas if you graft but upon one Stocke, the *Tree* can beare but few.

434

The Digging yearly about the *Roots* of *Trees*, which is a great meanes, both to the *Acceleration* and *Melioration* of *Fruits*, is practised in nothing but in *Vines*; Which if it were transferred unto other *Trees*, and *Shrubs*, (as *Roses*, &c. I conceive would advance them likewise.

435

It hath beene knowne, that a *Fruit-Tree* hath beene blowne up (almost) by the *Roots*, and set up againe, and the next yeare bare exceedingly. The Cause of this, was nothing but the *Loosening* of the *Earth*, which comforteth any *Tree*, and is fit to be practised, more than it is, in *Fruit-Trees*: For *Trees* cannot be so fitly removed into New Grounds, as *Flowers* and *Herbs* may.

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To revive an *Old Tree*, the Digging of it about the *Roots*, and Applying new Mould to the *Roots*, is the way. We see also that *Draught-Oxen*, put into fresh Pasture, gather new and tender Flesh; And in all Things, better Nourishment than hath beene used, doth help to renew; Especially, if it be not onely better, but changed, and differing from the former.

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If an *Herb* be cut off from the *Roots*, in the beginning of Winter, and then the *Earth* be trodden and beaten downe hard, with the Foot and Spade, the *Roots* will become of verie great Magnitude in Summer. The Reason is, for that the Moisture being forbidden to come up in the Plant, stayeth longer in the Root, and so dilateth it. And *Gardeners* use to tread downe any loose Ground, after they have sowne *Onions*, or *Turnips*, &c.

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If *Panicum* be laid below, and about the Bottome of a *Root*, it will cause the Root to grow to an Excessive Bignesse. The Cause is, for that being it selfe of a Spungie Substance, it draweth the Moisture of the *Earth* to it, and so feedeth the Root. This is of greatest use for *Onions*, *Turnips*, *Parships*, and *Carrets*.

439

The Shifting of Ground is a Meanes to better the *Tree*, and Fruit; But with this Caution; That all Things doe prosper best, when they are advanced to the better: Your *Nurserie* of *Stocks* ought to be in a more Barren

Barren Ground, than the Ground is whereunto you remove them. So all *Grassers* preferre their Cattell from meaner Pastures to better. We see also, that Hardnesse in Youth lengthneth Life, because it leaveth a Cherishing to the better, of the Body, in Age: Nay in Exercises, it is good to begin with the hardest, as Dancing in Thicke Shooes &c.

It hath beene observed, that *Hacking* of *Trees* in their *Barke*, both downe-right, and acrosse, so as you make them rather in slices, than in continued Hacks, doth great good to *Trees*; And especially deliveth them from being *Hide-bound*, and killeth their *Mosse*.

Shade to some *Plants* conduceth to make them large, and prosperous, more than *Sun*; As in *Strawberries*, and *Bayes*, &c. Therefore amongst *Strawberries*, sow here and there some *Borage-Seed*; And you shall finde the *Strawberries* under those *Leaves* farre more large than their Fellowes. And *Bayes* you must plant to the *North*; Or defend them from the *Sunne* by a *Hedge-Row*; And when you sow the *Berries*, weed not the *Borders*, for the first halfe yeare; For the *Weed* giveth them *Shade*.

To increase the *Crops* of *Plants*, there would be considered, not onely the *Increasing* the *Lust* of the *Earth*, or of the *Plant*, but the *Saving* also of that which is spilt. So they have lately made a *Triall*, to *Set Wheat*; which neverthelesse hath beene left off, because of the trouble and paines; Yet so much is true, that there is much saved by the *Setting*, in comparison of that which is *sown*; Both by keeping it from being picked up by *Birds*; And by *Avoiding* the *Shallow* lying of it, whereby much that is sown taketh no *Root*.

It is prescribed by some of the *Ancients*, that you take *Small Trees*, upon which *Figs* or other *Fruit* grow, being yet unripe, and cover the *Trees* in the *Middle* of *Autumne* with dung, untill the *Spring*; And then take them up in a warme day, and replant them in good *Ground*; And by that meanes, the former yeares *Tree* will be ripe, as by a new *Birch*; when other *Trees* of the same kinde, doe but blossome. But this seemeth to have no great *Probabilitie*.

It is reported, that if you take *Nitre*, and mingle it with *Water*, to the thicknesse of *Honey*, and therewith anoint the *Bud*, after the *Vine* is cut, it will sprout forth within eight dayes. The *Cause* is like to be, (if the *Experiment* be true,) the *Opening* of the *Bud*, and of the *Parts* *Contiguous*, by the *Spirit* of the *Nitre*; For *Nitre* is (as it were) the *Life* of *Vegetables*.

Take *Seed*, or *Kernells* of *Apples*, *Pearres*, *Orenges*; Or a *Peach*, or a *Plum-Stone*, &c. And put them into a *Squill*, (which is like a great *Onion*;) and they will come up much earlier than in the *Earth* it selfe. This I conceive to be as a *Kinde* of *Grafting* in the *Root*; For as the *Stock* of a *Graft* yeeldeth better prepared *Nourishment* to the *Graft*, than the *Crude Earth*; So the *Squill* doth the like to the *Seed*. And I suppose the same would be done, by *Putting Kernells* into a *Turnip*, or

the like; Save that the *Squill* is more Vigorous, and Hot. It may be tried also, with putting *Onion-Seed* into an *Onion-Head*, which thereby (perhaps) will bring forth a larger, and earlier *Onion*.

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The *Pricking* of a *Fruit* in severall places, when it is almost at his *Big-ness*, and before it ripeneth, hath beene practised with successe, to ripen the *Fruit* more suddenly. Wee see the Example of the *Biting* of *Wasps*, or *Wormes*, upon *Fruit*, whereby it (manifestly) ripeneth the sooner.

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It is reported, that *Alga Marina* (*Sea-weed*) put under the *Roots* of *Coleworts*, and (perhaps) of other *Plants*, will further their Growth. The vertue (no doubt) hath Relation to *Salte*, which is a great Help to *Fertilitie*.

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It hath beene practised, to cut off the *Stalks* of *Cucumbers*, immediately after their *Bearing*, close by the *Earth*; And then to cast a prettie Quantitie of *Earth* upon the *Plant* that remaineth; and they will beare the next yeare *Fruit*, long before the ordinarie time. The Cause may be, for that the *Sap* goeth downe the sooner, and is not spent in the *Stalke* or *Leafe*, which remaineth after the *Fruit*. Where note, that the *Dying*, in the winter, of the *Roots* of *Plants*, that are *Annually*, seemeth to be partly caused by the *Over-Expence* of the *Sap* into *Stalke*, and *Leaves*; which being prevented, they will super-annate, if they stand warme.

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The *Pulling off* many of the *Blossomes* from a *Fruit-Tree*, doth make the *Fruit* fairer. The Cause is manifest; For that the *Sap* hath the lesse to nourish. And it is a Common Experience, that if you doe not pull off some *Blossomes*, the first time a *Tree* bloometh, it will blossome it selfe to death.

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It were good to trie, what would be the Effect, if all the *Blossomes* were pulled from a *Fruit-Tree*; Or the *Acornes* and *Chestnut-buds*, &c. from a *Wilde Tree*, for two yeares together. I suppose that the *Tree* will either put forth, the third yeare, bigger, and more plentifull *Fruit*; Or else, the same yeares, larger *Leaves*, because of the *Sap* stored up.

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It hath beene generally received, that a *Plant* watered with *Warmed Water*, will come up sooner and better, than with *Cold Water*, or with *Showers*. But our Experiment of *Watering Wheat* with *Warmed Water* (as hath beene said) succeeded not; which may be, because the Triall was too late in the Yeare, viz. in the End of *October*. For the *Cold* then coming upon the *Seed*, after it was made more tender by the *Warmed Water*, might check it.

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There is no doubt, but that *Grafting* (for the most Part) doth meliorate the *Fruit*. The Cause is manifest; For that the Nourishment is better prepared in the *Stocke*, than in the *Crude Earth*: But yet note well, that there be some *Trees*, that are said to come up more happily from the *Bernell*, than from the *Graft*; As the *Peach*, and *Melocotone*. The Cause I suppose to be, for that those *Plants* require a Nourishment of great Moisture; And though the Nourishment of the *Stocke* be finer, and

and better prepared, yet it is not so moist, and plentifull, as the Nourishment of the *Earth*. And indeed wee see those *Fruits* are verie Cold *Fruits* in their Nature.

It hath beene received, that a Smaller *Peare*, grafted upon a *Stocke* that beareth a greater *Peire*, will become Great. But I thinke it is as true, as that of the *Prime-Fruit* upon the *Late Stocke*; And *è converso*; which we rejected before: For the *Cions* will governe. Neverthelesse it is probable enough, that if you can get a *Cions* to grow upon a *Stocke* of another kinde, that is much moyster than his owne *Stocke*, it may make the *Fruit* Greater, because it will yeeld more plentifull nourishment; Though it is like it will make the *Fruit* Bitter. But generally, the *Grafting* is upon a drier *Stock*; As the *Apple* upon a *Crab*; The *Peare* upon a *Thorne*; &c. Yet it is reported, that in the *Low-Countries* they will graft an *Apple-Cions* upon the *Stocke* of a *Colewort*, and it will beare a great flaggie *Apple*; The *Kernell* of which, if it be set, will be a *Colewort*, and not an *Apple*. It were good to trie, whether an *Apple-Cions* will prosper, if it be grafted upon a *Sallow*, or upon a *Poplar*, or upon an *Alder*, or upon an *Elme*, or upon an *Horse-Plumme*, which are the moystest of *Trees*. I have heard that it hath beene tried upon an *Elme*, and succeeded.

It is manifest by Experience, that *Flowers* Removed wax greater, because the Nourishment is more easily come by, in the loose *Earth*. It may be, that Oft Regrafting of the same *Cions*, may likewise make *Fruit* greater; As if you take a *Cions*, and graft it upon a *stocke* the first yeare; And then cut it off, and graft it upon another *stocke* the second yeare; and so for a third; Or fourth yeare; And then let it rest, it will yeeld afterward, when it beareth, the greater *Fruit*.

Of Grafting there are many Experiments worth the Noting, but those wee reserve to a proper Place.

It maketh *Figs* better, if a *Fig-Tree*, when it beginneth to put forth Leaves, have his Top cut off. The Cause is plaine, for that the *Sap* hath the lesse to feed, and the lesse way to mount: But it may be, the *Figs* will come somewhat later, as was formerly touched. The same may be tried likewise in other *Trees*.

It is reported, that *Mulberries* will be fairer, and the *Trees* more fruitfull, if you bore the Truncke of the *Tree* thorow, in severall places, and thrust into the Places bored, Wedges of some Hot *Trees*, as *Turpentine*, *Mustick-Tree*, *Guaiacum*, *Juniper*, &c. The Cause may be, for that *Adventive Heat* doth cheate up the Native Iuyce of the *Tree*.

It is reported, that *Trees* will grow greater, and beare better *Fruit*, if you put *Salt*, or *Aces of Wine*, or *Bloud* to the Root. The Cause may be the Encreasing the Lust or Spirit of the Root, These Things being more forcible, than ordinarie *Composts*.

It is reported by one of the Ancients, that *Artichokes* will be lesse prickly, and more tender, if the seeds have their Tops dulled, or grated off upon a Stone.

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Herbs will be tender, and fairer; if you take them out of *Beds*, when they are newly come up, and remove them into *Pots*, with better *Earth*. The Remove from *Bed* to *Bed* was spoken of before; But that was in severall yeares; This is, on the sudden. The Cause is the same with other *Removes*, formerly mentioned.

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Coleworts are reported by one of the *Ancients*, to prosper exceedingly, and to be better tasted, if they be sometimes watered with *Salt-Water*; And much more with *Water* mixed with *Nitre*; The Spirit of which is lesse Adherent than *Salt*.

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It is reported, that *Cucumbers* will prove more Tender, and Daintie, if their *Seeds* be steeped (a little) in *Milke*; The Cause may be, for that the *Seed* being mollified with the *Milke*, will be too weake to draw the grosser Iuyce of the *Earth*, but onely the finer. The same Experiment may be made in *Artichokes*, and other *Seeds*, when you would take away, either their *Flatinesse*, or *Bitternesse*. They speake also, that the like Effect followeth, of steeping in *Water* mixed with *Honey*; But that seemeth to me not so probable, because *Honey* hath too quicke a Spirit.

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It is reported that *Cucumbers* will be lesse Watry, and more Melon-like, if in the Pit where you set them, you fill it (halfe way up) with *Chaffe*, or small *Sticks*, and then powre *Earth* upon them; For *Cucumbers*, as it seemeth, doe extremely affect Moisture; And over-drinke themselves; Which this *Chaffe*, or *Chips*, forbiddeth. Nay it is further reported, that if when a *Cucumber* is growne, you set a Pot of water about five or six inches distance from it, it will, in 24. houres, shoot so much out, as to touch the Pot; Which if it be true, it is an Experiment of an higher Nature, than belongeth to this Title. For it discovereth Perception in *Plants*, to move towards that which should help and comfort them, though it be at a distance. The ancient Tradition of the *Vine* is far more strange: It is, that if you set a Stake, or Prop, some distance from it, it will grow that way; Which is faire stranger (as is said) than the other; For that *Winds* may worke by a Sympathy of Attraction: But this of the Stake seemeth to be a Reasonable Discourse.

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It hath beene touched before, that *Terebration* of *Trees* doth make them prosper better. But it is found also, that it maketh the *Fruit* sweeter, and better. The Cause is, for that notwithstanding the *Terebration*, they may receive Aliment sufficient; And yet no more than they can well turne, and digest; And withall doe sweat out the coarsest and unprofitable Iuyce. Even as it is in *Living Creatures*, which by Moderate Feeding, and Exercise, and Sweat, attaine the soundest Habite of Body.

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As *Terebration* doth Meliorate *Fruit*, so, upon the like reason, doth Letting of *Plants* Blood; As *Prickly Pines*, or other *Trees*, after they be of some Growth; And thereby letting forth Gumme, or Teares; Though this be not to continue, as it is in *Terebration*, but at some Seasons. And it is reported, that by this Artifice, Bitter *Almonds* have beene turned into Sweet.

The Ancients for the *Dilcorating* of *Fruit*, doe commend *Swines-Dung* above all other *Dung*; Which may be, because of the Moisture of that Beast, whereby the *Excrement* hath lesse Acrimony; For wee see *Swines* and *Pigges* Flesh is the Moistest of Fleshes.

It is observed by some, that all *Herbs* wax sweeter, both in Smell and Taste, if after they be growne up some reasonable time, they be cut, and so you take the latter Sprout. The Cause may be for that the longer the Iuyce stayeth in the Roor, and Stalke, the better it concocteth. For one of the Chiefe Causes, why *Graines*, *Seeds*, and *Fruits*, are more Nourishing than *Leaves*, is the length of time, in which they grow to *Maturation*. It were not amisse to keepe backe the Sap of *Herbs*, or the like, by some fit meanes, till the end of Summer; whereby (it may be) they will be more Nourishing.

As *Grafting* doth generally advance and *Meliorate Fruits*, above that which they would be, if they were set of *Kernells*, or *Stones*, in regard the *Nourishment* is better concocted; So (no doubt) even in *Grafting*, for the same cause, the Choyse of the *Stocke* doth much; Alwayes provided, that it be somewhat inferiour to the *Cions*. For otherwise it dul- leth it. They commend much the *Grafting* of *Pears*, or *Apples*, upon a *Quince*.

Besides the *Meanes* of *Melioration* of *Fruits*, before mentioned, it is set downe as tried, that a *Mixture* of *Bran*, and *Swines-Dung*; Or *Chaffe* and *Swines-Dung*; (especially laid up together for a Moneth to rot,) is a verie great Nourisher, and Comforter to a *Fruit-Tree*.

It is delivered, that *Onions* wax greater, if they be taken out of the Earth, and laid a drying twentie dayes, and then set againe; And yet more, if the ourermost Pill be taken off all over.

It is delivered by some, that if one take the *Bough* of a *Low Fruit-tree*, newly budded, and draw it gently, without hurting it, into an *Earthen Pot* perforate at the bottome to let in the *Plant*, and then Cover the *Pot* with Earth, it will yeeld a verie large *Fruit*, within the Ground. Which *Experiment* is Nothing but *Potting* of *Plants*, without Removing, and Leaving the *Fruit* in the Earth. The like, (they say,) will be effected, by an *Emprie Pot* without Earth in it, put over a *Fruit*, being propped up with a *Stake*, as it hangeth upon the *Tree*; And the better, if some few *Pertusions* be made in the *Pot*. Wherein, besides the *Defending* of the *Fruit*, from *Extemitie* of *Sunne* or *Weather*, some give a reason, that the *Fruit*, Loving and Coveting the open Aire and *Sunne*, is invited by those *Pertusions*, to spread and approach, as neare the open Aire, as it can; And so enlargeth in *Magnitude*.

All *Trees*, in *High* and *Sandy Grounds*, are to be set deepe; And in *Watry Grounds*, more shallow. And in all *Trees*, when they be removed (especially *Fruit-Trees*) care ought to be taken, that the *Sides* of the *Trees* be coasted, (*North* and *South*, &c.) as they stood before. The same is said also of *Stone* out of the *Quarry*, to make it more durable; Though that seemeth

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seemeth to have lesse reason; Because the *Stone* lyeth not so neare the *Sunne*, as the *Tree* groweth.

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Timber Trees in a *Coppice Wood*, doe grow better, than in an *Open Field*; Both because, they offer not to spread so much, but shoot up still in *Height*; And chiefly because they are defended from too much *Sun* and *Wind*, which doe checke the *Growth* of all *Fruit*; And so (no doubt) *Fruit-Trees*, or *Vines*, set upon a *Wall*, against the *Sunne*, betweene *Elbowes* or *Buttresses* of *Stone*, ripen more, than upon a *Plaine Wall*.

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It is said, that if *Potato Roots*, be set in a *Pot* filled with *Earth*, and then the *Pot* with *Earth* be set likewise within the *Ground*, some two or three *Inches*, the *Roots* will grow greater, than *Ordinarie*. The *Cause* may be, for that Having *Earth* enough within the *Pot* to nourish them; And then being stopped by the *Bottom* of the *Pot* from putting *Strings* downward, they must needs grow greater in *Breadth*, and *Thicknesse*. And it may be, that all *Seeds* or *Roots*, *Potted*, and so set into the *Earth*, will prosper the better.

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The *Cutting off* the *Leaves* of *Radish*, or other *Roots*, in the beginning of *Winter*, before they wither, And *Covering* againe the *Root*, something high with *Earth*; Will preserve the *Root* all *Winter*, and make it bigger, in the *Spring* following, as hath beene partly touched before. So that there is a double *Vse* of this *Cutting off* the *Leaves*: For in *Plants*, where the *Root* is the *Esculent*, as *Radish*, and *Parsnips*, it will make the *Root* the greater; And so it will doe to the *Heads* of *Onions*. And where the *Fruit* is the *Esculent*, by *Strengthening* the *Root*, it will make the *Fruit* also the greater.

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It is an *Experiment* of great pleasure, to make the *Leaves* of *Shadie Trees*, larger than *ordinarie*. It hath beene tried (for certaine) that a *Cion* of a *Weech-Elme*, grafted upon the *Stocke* of an *Ordinarie Elme*, will put forth *Leaves*, almost as broad as the *Brimme* of ones *Hat*. And it is verie likely, that as in *Fruit-Trees*, the *Graft* maketh a greater *Fruit*; So in *Trees* that beare no *Fruit*, it will make the greater *Leaves*. It would be tried therefore in *Trees* of that kinde chiefly; As *Birch*, *Ash*, *Willow*; And especially the *Shining Willow*, which they call *Swallow-Taile*, because of the pleasure of the *Leaf*.

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The *Barrennesse* of *Trees*, by *Accident*, (besides the *Weaknesse* of the *soile*, *seed*, or *Root*; And the *Injanie* of the *Weather*) commeth either of their *Over-growing* with *Mosse*; Or their being *Hide-bound*; Or their *Planting too deepe*; Or by *Issuing* of the *Sap too much* into the *Leaves*. For all these there are *Remedies* mentioned before.

Experiments
in *Copied*
touching *com-*
pound Fruits
and *Flowers*.

Wee see that in *Living Creatures*, that have *Male* and *Female*, there is *Copulation* of severall *Kindes*; and so *Compound Creatures*; As the *Male*, that is generated betwixt the *Horse* and the *Ass*; And some other *Compounds*, which we call *Monsters*.

sters, though more rare: And it is held, that that *Proverbe*, *Africa semper aliquid Monstri patit*; commeth, for that the Fountaines of Waters there, being rare, divers Sorts of Beasts come from severall Parts to drinke; And so being refreshed, fall to couple, and many times with severall Kinds. The *Compounding* or *Mixture* of *Kinds* in *Plants* is not found out; Which neverthelesse, if it be possible, is more at command, than that of *living Creatures*; For that their Lust requireth a voluntarie Motion: wherefore it were One of the most Noble *Experiments* touching *Plants*, to finde it out: For so you may have great Varietie of New *Fruits*, and *Flowers* yet unknowne. *Grafting* doth it not: That mendeth the *Fruit*, or doubleth the *Flowers*, &c. But it hath not the Power to make a New *Kinde*. For the *Cions* ever over-ruleth the *Stocke*.

It hath beene set downe by one of the *Ancients*, that if you take two *Twigs* of severall *Fruit Trees*, and flat them on the Sides, and then binde them close together, and set them in the ground, they will come up in one *Stock*; But yet they will put forth their severall *Fruits*, without any *Commixture* in the *Fruit*. Wherein note (by the way) that *Unitie* of *Continuance*, is easier to procure, than *Unitie* of *Species*. It is reported also that *Vines* of *Red* and *White Grapes*, being set in the Ground, and the upper Parts being flatted, and bound close together, will put forth *Grapes* of the severall Colours, upon the same Branch; And *Grape-Stones* of severall Colours within the same *Grape*: But the more, after a yeare or two; The *Unitie* (as it seemeth) growing more Perfect. And this will likewise help, if from the first *Uniting*, they be often Watred; For all Moisture helpeth to *Union*. And it is prescribed also, to binde the *Bud*, as soone as it commeth forth, as well as the *Stocke*; At the least for a time.

They report, that divers *Seeds*, put into a *Clout*, and laid in Earth well dunged, will put up *Plants* *Contiguous*; Which (afterwards) being bound in, their *Shoots* will *Incorporate*. The like is said of *Kernels*, put into a *Bottle*, with a Narrow Mouth, filled with Earth.

It is reported, that young *Trees* of severall kindes, set contiguous, without any binding, and verie often Watred, in a *Fruitfull Ground*, with the verie *Luxurie* of the *Trees*, will incorporate, and grow together. Which seemeth to me the likeliest Meanes, that hath beene propounded; For that the *Binding* doth hinder the *Naturall Swelling* of the *Tree*; which, while it is in Motion, doth better unite.

There are many Ancient and Received Traditions and Observations, touching the *Sympathy* & *Antipathy* of *Plants*;

For

Experiments
in Consort
touching the
Sympathy and
Antipathy of
Plants.

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For that some will thrive best growing neere others; which they impute to *Sympathy*: And some worse; which they impute to *Antipathy*. But these are Idle and Ignorant Conceits; And forsake the true *Indication* of the *Causes*; As the most Part of *Experiments*, that concern *Sympathies* and *Antipathies* doe. For as to *Plants*, neither is there any such Secret *Friendship*, or *Hatred*, as they imagine; And if we should be content to call it *Sympathy*, and *Antipathy*, it is utterly mistaken; For their *Sympathy* is an *Antipathy*, and their *Antipathy* is a *Sympathy*: For it is thus; Wheresoever one *Plant* draweth such a particular Iuyce out of the Earth; as it qualificth the Earth; So as that Iuyce which remaineth is fit for the other *Plant*, there the Neighbourhood doth good; Because the Nourishments are contrarie, or severall: But where two *Plants* draw (much) the same Iuyce, there the Neighbourhood hurteth; For the one deceiveth the other.

First therefore, all *Plants* that doe draw much *Nourishment* from the Earth, and so soake the Earth, and exhaust it; hurt all Things that grow by them; As *Great Trees*, (especially *Ashes*,) and such *Trees*, as spread their *Roots*, neere the Top of the Ground. So the *Colewort* is not an Enemy (though that were anciently received) to the *Vine* only; But it is an Enemy to any other *Plant*; Because it draweth strongly the fattest Iuyce of the Earth. And if it be true, that the *Vine*, when it creepeth neere the *Colewort*, will turne away; This may be, because there it findeth worse Nourishment; For though the *Root* be where it was, yet (I doubt) the *Plant* will bend as it nourisheth.

Where *Plants* are of severall Natures, and draw severall Iuyces out of the Earth, there (as hath beene said) the One set by the other helpeth: As it is set downe by divers of the Ancients, that *Rew* doth prosper much, and becommeth stronger, if it be set by a *Figge-Tree*: which (we conceive) is caused, Not by Reason of *Frindship*, but by *Extraction* of a Contrarie Iuyce: The one Drawing Iuyce fit to result Sweet, the other bitter. So they have set downe likewise, that a *Rose* set by *Garlick* is sweeter: Which likewise may be, because the more Fetide Iuyce of the Earth goeth into the *Garlick*; And the more Odorate into the *Rose*.

This wee see manifestly, that there be certaine *Corne-Flowers*, which come seldome or never in other places, unlesse they be set; But onely amongst *Corne*: As the *Blew-Bottle*, a kinde of *Yellow Mary-Gold*, *Wilde Poppy*, and *Fumitorie*. Neither can this be, by Reason of the Culture of the Ground, by Plowing, or Furrowing; As some *Herbs*, and *Flowers*, will grow but in *Ditches* new Cast; For if the *Ground* lie fallow, and unsowne, they will not come: So as it should seeme to be the *Corne*, that

that qualifieth the Earth, and prepareth it for their Growth.

This Observation, if it holdeth, (as it is verie probable,) is of great use, for the *Meliorating of Taste in Fruits, and Esculent Herbs*; And of the *Sent of Flowers*. For I doe not doubt, but if the *Figge-Tree* doe make the *Rew* more strong, and bitter, (as the Ancients have noted,) good store of *Rew* planted about the *Figge-Tree*, will make the *Figge* more sweet. Now the *Tastes* that doe most offend in *Fruits, and Herbs, and Roots, are Bitter; Harsh; Sowre; And Watrish, or Flasbie*. It were good therefore to make the *Trials* following.

Take *Wormewood, or Rew*, and set it neere *Lettuce, or Coleflorie, or Artichoke*; And see whether the *Lettuce, or the Coleflorie, &c.* become not the sweeter.

Take a *Service-Tree, or a Cornelian-Tree, or an Elder-Tree*, which we know have *Fruits* of harsh and binding Iuyce, and set them neere a *Vine, or Figge-Tree*, & see whether the *Grapes, or Figs*, will not be the sweeter.

Take *Cucumbers, or Pumpions*, and set them (here and there) amongst *Muske-Melons*, and see whether the *Melons* will not be more Winy, and better tasted. Set *Cucumbers* (likewise) amongst *Radish*, and see whether the *Radish* will not be made the more Biting.

Take *Sorrell*, and set it amongst *Rasps*, and see whether the *Rasps* will not be the sweeter.

Take *Common Briar*, and set it amongst *Violets, or Wall-Flowers*, and see whether it will not make the *Violets, or Wall-Flowers* sweeter, and lesse Earthy in their Smell. So set *Lettuce, or Cucumbers*, amongst *Rosemary, or Bayes*, and see whether the *Rosemary, or Bayes*, will not be the more Odorate, or Aromaticall.

Contrariwise, you must take heed, how you set *Herbs* together, that draw much the like Iuyce. And therefore I thinke *Rosemary* will leese in Sweetnesse, if it be set with *Lavender, or Bayes, or the like*. But yet, if you will correct the strength of an Herb, you shall doe well to set other like Herbs by him, to take him downe; And if you should set *Tansy* by *Angelica*, it may be, the *Angelica* would be the weaker, and fitter for Mixture in Perfume. And if you should set *Rew* by *Common Wormewood*, it may be, the *Wormewood* would turne to be liker *Roman Wormewood*.

This *Axiome* is of large extent; And therefore would be severed, and refined by *Triall*. Neither must you expect to have a *Grosse Difference* by this kinde of Culture, but only *Further Perfection*.

Triall would be also made in *Herbs Poysonous, and Purgative*, whose ill Qualitie (perhaps) may be discharged, or attempted, by Setting stronger *Poysons, or Purgatives*, by them.

It is reported, that the *Shrub* called *Our Ladies Seale*; (which is a Kinde of *Briony*;) and *Coleworts*, set neere together, one or both will die. The Cause is, for that they be both great Depredatours of the Earth, and one of them starveth the other. The like is said of a *Reed*, and a *Brake*; Both which are succulent; And therefore the One deceiveth

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ceiveth the Other. And the like of *Hemlock* and *Rew*; Both which draw strong Iuyces.

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Some of the Ancients, and likewise divers of the Moderne Writers, that have laboured in *Naturall Magick*, have noted a *Sympathy*, between the *Sunne*, *Moone*, and some Principall *Starres*; And certaine *Herbs*, and *Plants*. And so they have denominated some *Herbs Solar*, and some *Lunar*; And such like Toyes put into great Words. It is manifest, that there are some *Flowers*, that have *Respect* to the *Sunne*, in two *Kindes*; The one by *Opening* and *Shutting*; And the other by *Bowing* and *Inclining* the *Head*. For *Mary-golds*, *Tulippa's*, *Pimpernell*, and indeed most *Flowers*, doe open or spread their *Leaves* abroad, when the *Sunne* shineth serene and faire: And againe, (in some part,) close them, or gather them inward, either towards *Night*, or when the *Skie* is overcast. Of this there needeth no such Solemne Reason to be assigned; As to say, that they rejoyce at the presence of the *Sunne*; And mourne at the Absence thereof. For it is Nothing else, but a little Loading of the *Leaves*, and Swelling them at the *Bottom*, with the *Moisture* of the *Aire*; whereas the drie *Aire* doth extend them: And they make it a Peece of the wonder, that *Garden Claver* will hide the *Stalke*, when the *Sunne* sheweth bright; Which is Nothing, but a full Expansion of the leaves. For the *Bowing* and *Inclining* the *Head*; it is found in the great *Flower* of the *Sunne*; in *Mary-golds*; *Wart-wort*; *Mallow Flowers*; and others. The Cause is somewhat more Obscure than the former; But I take it to be no other, but that the Part against which the *Sunne* beateth, waxeth more faint and flaccide in the *Stalke*, And thereby lesse able to support the *Flower*.

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What a little *Moisture* will doe in *Vegetables*, even though they be dead, and severed from the *Earth*, appeareth well in the *Experiment* of *Juglers*. They take the *Beard* of an *Oate*; which (if you marke it well,) is wreathed at the *Bottom*, and one smooth entire *Straw* at the *Top*. They take onely the Part that is Wreathed, and cut off the other, leaving the *Beard* halfe the Breadth of a finger in length. Then they make a little *Crosse* of a *Quill*, long wayes of that Part of the *Quill*, which hath the *Pith*; And *Crosse*-wayes of that Peece of the *Quill* without *Pith*; The whole *Crosse* being the Breadth of a Finger high. Then they pricke the *Bottom* where the *Pith* is, and thereinto they put the *Oaten-beard*, leaving halfe of it sticking forth of the *Quill*: Then they take a little white Box of wood, to deceive Men, as if somewhat in the Box did worke the *Fear*: In which, with a *Pinne*, they make a little Hole, enough to take the *Beard*, but not to let the *Crosse* sinke downe, but to sticke. Then likewise by way of *Imposture*, they make a *Question*; As, Who is the Fairest Woman in the Company? Or, Who hath a Glove, or Card? And cause Another to name divers Persons: And upon everie Naming, they sticke the *Crosse* in the Box, having first put it towards their Mouth, as if they charmed it; And the *Crosse* stirreth not; But when they come to the Person that they would take; As they hold the *Crosse* to their Mouth, they

they touch the *Beard* with the Tip of their Tongue, and wet it; And so sticke the *Crosse* in the *Box*; And then you shall see it turne finely and softly, three or foure Turnes; Which is caused by the untwining of the *Beard* by the Moisture. You may see it more evidently, if you sticke the *Crosse* betweene your fingers, in stead of the *Box*; And therefore you may see, that this Motion, which is Effected by so little Wet, is stronger than the Closing or Bending of the Head of a *Marigold*.

It is reported by some, that the *Herb* called *Rosa-Solis*, (whereof they make Strong Waters,) will at the Noone-day, when the *Sunne* shineth hot and bright, have a great Dew upon it. And therefore, that the right Name is *Ros Solis*: which they impure to a Delight and *Sympathy*, that it hath with the *Sunne*. Men favour Wonders! It were good first to be sure, that the Dew that is found upon it, bee not the Dew of the Morning Preserved, when the Dew of other *Herbs* is breathed away; for it hath a smooth and thicke Lease, that doth not discharge the Dew so soone, as other *Herbs*, that are more Spungy and Porous. And it may bee Purslane, or some other Herb, doth the like, and is not marked. But if it bee so, that it hath more Dew at Noone, than in the Morning, then sure it seemeth to be an Exudation of the *Herb* it selfe. As Plums sweat when they are set into the Oven: for you will not (I hope) thinke, that it is like *Gedeons Eleece of wooll*, that the Dew should fall upon that, and no where else.

It is certaine, that the *Honey-dews*, are found more upon *Oake-leaves*, than upon *Alb*, or *Beech*, or the like: But whether any *Cause* be, from the *Leafe* it selfe, to concoct the Dew; Or whether it bee onely, that the *Leafe* is Close and Smooth; (And therefore drinketh not in the Dew, but preserveth it;) may be doubted. It would be well inquired, whether *Manna* the *Drug*, doth fall but upon certaine *Herbs* or *Leaves* onely. *Flowers* that have deepe *Sockets*, doe gather in the Bottome, a kinde of *Honey*; As *Honey-Suckles*; (both the *woodbine*, and the *Trifoile*;) *Lillies*; and the like. And in them certainly the *Flower* beareth part with the *Dew*.

The Experience is, that the *Froth*, which they call *Woodesare*, (being like a kinde of Spittle,) is found but upon certaine *Herbs*, and those Hot Ones; As *Lavender*, *Lavender-cotton*, *Sage*, *Hissope*, &c. Of the Cause of this enquire further; For it seemeth a Secret. There falleth also *Mildew* upon *Corne*, and smuttereth it; But it may bee, that the same falleth also upon other *Herbs*, and is not observed.

It were good, Triall were made, whether the great Consent betweene *Plants* and *Water*, which is a principall Nourishment of them, will make an *Attraction* or Distance, and not at Touch only. Therefore take a *Vessell*, and in the middle of it make a false Bottome of course Canvasse: Fill it with Earth above the Canvasse, and let not the Earth bee watred; Then sow some good *seeds* in that Earth; But under the Canvasse, some halfe a foot in the Bottome of the Vessell, lay a great *Sponge*, thorowly wet in water; And let it lye so some ten Dayes; And

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Experiments
in Confort,
touching the
Making Herbs
and Fruits Me-
dicinable.

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See whether the *Seeds* will sprout, and the *Earth* become more Moist, & the *Sponge* more dry. The *Experiment* formerly mentioned of the *Cucumber*, creeping to the Pot of *Water*, is far stranger than this.

The *Altering* of the *Sent*, *Colour*, or *Taste* of *Fruit*, by *Infusing*, *Mixing*, or *Letting* into the *Bark*, or *Root* of the *Tree*, *Herb*, or *Flower*, any *Coloured*, *Aromaticall*, or *Medicinall* Substance; are but *Fancies*. The *Cause* is, for that those *Things* have passed their *Period*, and nourish not. And all *Alienation* of *Vegetables*, in those *Qualities*, must be by somewhat, that is apt to goe into the *Nourishment* of the *Plant*. But this is true; that where *Kine* feed upon *Wilde Garlicke*, their *Milke* tasteth plainly of the *Garlicke*. And the *Flesh* of *Muttons* is better tasted where the *Sheepe* feed upon *Wilde Thyme*, and other wholesome *Herbs*. *Galen* also speaketh of the *Curing* of the *Scurvy* of the *Liver*, by *Milke* of a *Cow*, that feedeth but upon certaine *Herbs*; And *Honey* in *Spaine* smelleth (apparently) of the *Rosemary*, or *Orange*, from whence the *Bee* gathereth it: And there is an old *Tradition* of a *Maiden* that was fed with *Napellus*; (which is counted the *Strongest* *Poyson* of all *Vegetables*;) which with use did not hurt the *Maid*, but poisoned some that had *Carnall* Company with her. So it is observed by some, that there is a vertuous *Bezoar*, and another without vertue; which appeare to the shew alike; But the *Vertuous* is taken from the *Beast*, that feedeth upon the *Mountaines*, where there are *Theriackall Herbs*; And that without *Vertue*, from those that feed in the *Valleys*, where no such *Herbs* are. Thus far I am of *Opinion*; That as *Steeped Wines* and *Beeres*, are very *Medicinall*; and likewise *Bread* tempered with divers *Powders*; So of *Meat* also, (as *Flesh*, *Fish*, *Milke*, and *Eggs*;) that they may bee made of great use for *Medicine*, and *Diet*, if the *Beast*, *Foule*, or *Fish*, be fed with a speciall kinde of food, fit for the *Disease*. It were a dangerous Thing also for secret *Empoysonments*. But whether it may be applyed unto *Plants*, and *Herbs*, I doubt more; Because the *Nourishment* of them is a more common *Juyce*; which is hardly capable of any speciall *Quality*, untill the *Plant* doe assimilate it.

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But lest our *Incredulity* may prejudice any profitable *Operations* in this kind, (especially since Many of the *Ancients* have set them down,) We thinke good briefly to proponnd the foure *Meanes*, which they have devised of *Making Plants Medicinable*. The First is by *Slitting* of the *Root*, and *Infusing* into it the *Medicine*; As *Hellebore*, *Opium*, *Scammony*, *Triacle*, &c. And then binding it up againe. This seemeth to me the least probable; Because the *Root* draweth immediately from the *Earth*; And so the *Nourishment* is the more *Common*, and lesse *Qualified*: And besides, it is a long time in *Going up*, ere it come to the *Fruit*. The Second Way is, to *Perforate* the *Body* of the *Tree*, and there to *Infuse* the *Medicine*: Which is somewhat better: For if any *Vertue* bee received from the *Medicine*, it hath the lesse way, and the lesse time, to goe up. The Third is, the *Steeping* of the *Seed* or *Kernell* in some *Liquour*, where-
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in the *Medicine* is *Infused*: Which I have little Opinion of, because the *Seed*, (I doubt,) will not draw the Parts of the *Matter*, which have the *Propriety*: But it will bee farre the more likely, if you mingle the *Medicine* with *Dung*; For that the *Seed* naturally drawing the *Moisture* of the *Dung*, may call in withall some of the *Propriety*. The fourth is, the *Watering* of the *Plant* oft, with an *Infusion* of the *Medicine*. This, in one respect, may have more force than the rest; Because the *Medication* is oft renewed; Whereas the rest are applyed but at one time: And therefore the *Vertue* may the sooner vanish. But still I doubt, that the *Root* is somewhat too stubborne to receive those fine *Impressions*; And besides, (as I said before,) they have a great *Hill* to goe up. I judge therefore the likeliest way to bee the *Perforation* of the *Body* of the *Tree*, in severall places, one above the other; And the *Filling* of the *Holes* with *Dung* mingled with the *Medicine*.

And the *Watring* of those *Lumps* of *Dung*, with
Squirts of an *Infusion* of the *Medicine* in
Dunged water, once in three
or foure *Daies*.

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intention is to be a little Opinion of, because the
said (I doubt) will not draw the Lines of the text, which have the
properly: But it will be found the more likely, if you mingle the
them with each other: For that the said naturally drawing the Matter of
the text, may still in withal some of the responses. The fourth is, the
Manner of the text, with an addition of the Medians. This, in one
text, may have more force than the rest; because the Medians is
of the text: Whereas the rest are applied but at one time: And
therefore the same may be found various. But still I doubt, that
the text is found in too many places to receive those fine responses;
And besides, as I said before, I have a great Mind to go up. I
find that the like is the way to be the responses of the text
of the text, in several places, as where the text; And the text
of the text with Day mingled with the Medians.
And the Manner of those Days of Day, with
of the text, as I said before, I have a great Mind to go up. I
find that the like is the way to be the responses of the text
of the text, in several places, as where the text; And the text
of the text with Day mingled with the Medians.

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NATVRALL HISTORIE.

VI. Century.



OV R Experiments we take care to be, (as we have often said,) either *Experimenta Fructifera*, or *Lucifera*; Either of Use, or of Discovery: For wee hate *Impostures*; And despise *Curiosities*. Yet because wee must apply our Selves somewhat to Others, wee will set downe some *Curiosities* touching *Plants*.

Experiments
in Consort,
touching *Curio-*
sities about
Fruits, and
Plants.

It is a *Curiosity*, to have severall *Fruits* upon one *Tree*; And the more, when some of them come *Earely*, and some come *Late*; So that you may have, upon the same *Tree*, Ripe *Fruits* all Sommer. This is easily done, by Grafting of severall *Cions*, upon severall Boughes, of a Stock, in a good Ground, plentifully fed. So you may have all Kindes of *Cherries*, and all kinds of *Plums*, and *Peaches*, and *Apricots*, upon one *Tree*; But I conceive the *Diversity* of *Fruits* must be such, as will graft upon the same Stocke. And therefore I doubt, whether you can have *Apples*, or *Pearres*, or *Orenge*s, upon the same Stocke, upon which you graft *Plummes*.

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It is a *Curiosity* to have *Fruits* of *Divers Shapes*, and *Figures*. This is easily performed by Moulding them, when the *Fruit* is young, with Moulds of Earth, or Wood. So you may have *Cucumbers*, &c. as Long

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as a Cane; Or as round as a Spheare; Or formed like a Crosse. You may have also Apples, in the forme of Peares, or Limons. You may have also Fruit in more Accurate Figures; As we said of Men, Beasts, or Birds, according as you make the Moulds. Wherein you must understand, that you make the Mould big enough, to containe the whole Fruit, when it is growne to the greatest: For else you will choake the Spreading of the Fruit; Which otherwise would spread it selfe, and fill the Concave, and so bee turned into the Shape desired; As it is in Mould workes of Liquid Things. Some doubt may bee conceived, that the Keeping of the Sunne from the Fruit, may hurt it: But there is ordinary experience of Fruit that groweth Covered. *Quære* also, whether some small Holes, may not be made in the Wood, to let in the Sunne. And note, that it were best to make the Moulds partible, glued, or cemented together, that you may open them, when you take out the Fruit.

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It is a Curiosity, to have Inscriptions, or Engravings, in Fruit, or Trees. This is easily performed, by Writing with a Needle, or Bodkin, or Knife, or the like, when the Fruit, or Trees are young; For as they grow, so the Letters will grow more large, and Graphicall.

*Tenerisq; meos incidere Amores
Arboribus, crescent illæ, crescetis Amores.*

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You may have Trees apparrelled with Flowers, or Herbs, by Boring Holes in the Bodies of them, and Putting into them Earth holpen with Mucke, and Setting Seeds, or Slips, of Violets, Strawberries, Wilde-Thyme, Camomill, and such like in the Earth. Wherein they doe but grow, in the Tree, as they doe in Pots; Though (perhaps) with some Feeding from the Trees. It would be tried also with Shoots of Vines, and Roots of Red-Roses; For it may bee, they being of a more Ligneous Nature, will incorporate with the Tree it selfe.

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It is an ordinary Curiosity, to Forme Trees and Shrubs, (as Rosemary, Juniper, and the like,) into Sundry Shapes; which is done by Moulding them within, and Cutting them without. But they are but lame Things, being too small to keepe Figure: Great Castles made of Trees upon Frames of Timber, with Turrets, and Arches, were anciently matters of Magnificence.

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Amongst Curiosities, I shall place Colouration, though it be somewhat better: For Beauty in Flowers is their Preheminence. It is observed by some, that Gilly-flowers, Sweet-Williams, Violets, that are Coloured, if they be neglected, and neither Watred, nor New Moulded, nor Transplanted, will turne White. And it is probable, that the White with much culture, may turne Coloured. For this is certaine, that the White Colour cometh of Scarcity of Nourishment; Except in Flowers that are onely White, and admit no other Colours.

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It is good therefore, to see what Natures doe accompany what Colours; For by that you shall have Light, how to induce Colours, by Producing those Natures. Whites are more Inodorate, (for the most part,) than

than *Flowers* of the same kinde Coloured ; As is found in *Single White Violets*, *White Roses*, *White Gilly-Flowers*, *White Stock-Gilly-Flowers*, &c. Wee finde also, that *Blossomes* of *Trees*, that are *White*, are commonly Inodorate, As *Cherries*, *Peares*, *Plummes* ; Whereas those of *Apples*, *Crabs*, *Almonds*, and *Peaches*, are Blushy, and Smell sweet. The Cause is, for that the Substance that Maketh the *Flower*, is of the thinnest and finest of the *Plant* ; Which also maketh *Flowers* to bee of so dainty Colours. And if it be too Sparing, and Thinne, it attaineth no Strength of Odour ; Except it bee in such *Plants*, as are very Succulent ; Whereby they need rather to bee scanted in their Nourishment, than replenished, to have them sweet. As wee see in *White Satyrion*, which is of a Dainty Smell ; And in *Beane-Flowers*, &c. And againe, if the *Plant* bee of Nature, to put forth *White Flowers* onely, and those not thinne, or dry, they are commonly of rancke and fulsome Smell ; As *May-Flowers*, and *White Lillies*.

Contrariwise, in *Berries*, the *White* is commonly more Delicate, and Sweet in Taste, than the Coloured ; As wee see in *white Grapes* ; In *White Raspes* ; In *White Strawberries* ; In *White Currans*, &c. The Cause is, for that the Coloured are more juyced, and courser juyced ; And therefore not so well and equally Concocted ; But the *White* are better proportioned, to the Digestion of the *Plant*.

But in *Fruits*, the *White* commonly is meaner ; As in *Pearre-Plums*, *Damasins*, &c. And the Choicest *Plummes* are Blacke ; The *Mulberry*, (which though they call it a *Berry*, is a *Fruit*,) is better the Blacke, than the *White*. The *Harvest White-Plumme*, is a base *Plumme* ; And the *Verdaccio* and *White Date-Plumme*, are no very good *Plummes*. The Cause is, for that they are all Over-watry : Whereas an higher Concoction is required for Sweetnesse, or Pleasure of Taste ; And therefore all your dainty *Plummes*, are a little dry, and come from the Stone ; As the *Muscle-Plumme*, the *Damasin-Plumme*, the *Peach*, the *Apricot*, &c. Yet some *Fruits*, which grow not to bee Blacke, are of the Nature of *Berries*, sweetest such as are Paler ; As the *Cœur Cherry*, which inclineth more to *White*, is sweeter than the *Red* ; But the *Egriot* is more lowre.

Take *Gilly-Flower Seed*, of one kinde of *Gilly-Flower* : (As of the *Clove-Gilly-Flower*, which is the most Common ;) And sow it ; And there will come up *Gilly-Flowers*, some of one Colour, and some of another, casually, as the *Seed* meeteth with Nourishment in the Earth ; So that the *Gardiners* finde, that they may have two or three *Roots* amongst an hundred, that are rare, and of great Price : As *Purple*, *Carnation* of severall *Stripes* ; The Cause is, (no doubt,) that in *Earth*, though it bee contiguous, and in one Bed, there are very severall *Juyces* ; And as the *Seed* doth casually meet with them, so it commeth forth. And it is noted especially, that those which doe come up *Purple*, doe alwayes come up *Single* ; The *Juyce*, as it seemeth, not being able to suffice a *Succulent Colour*, and a *Double Leaf*. This Experiment of severall Colours,

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lours, comming up from one *Seed*, would bee tried also in *Larkes-Foot*, *Monkes-Hood*, *Poppy*, and *Hollyoke*.

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Few *Fruits* are coloured *Red* within; The *Queene-Apple* is; And another *Apple*, called the *Rose-Apple*; *Malberries* likewise; and *Grapes*, though most toward the *Skinne*. There is a *Peach* also, that hath a *Circle of Red* towards the *Stone*: And the *Egriot-Cherry* is somewhat *Red* within; But no *Peare*, nor *Warden*, nor *P'umme*, nor *Apricot*, although they have (many times) *Red* sides, are Coloured *Red* within. The Cause may bee enquired.

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The generall Colour of *Plants* is *Greene*; which is a Colour that no *Flower* is of. There is a *Greenish Prime-Rose*, but it is *Pale*, and scarce a *Greene*; The *Leaves* of some *Trees* turne a little *Murvy*, or *Reddish*; And they be commonly *Young Leaves* that doe so; As it is in *Oakes*, and *Vines*, and *Hasle*. *Leaves* rot into a *Yellow*; And some *Hollies* have part of their *Leaves Yellow*, that are, (to all seeming,) as *Fresh* and *Shining*, as the *Greene*. I suppose also, that *Yellow* is a lesse *Succulent Colour*, than *Greene*; And a degree nearer *White*. For it hath beene noted, that those *Yellow Leaves* of *Holly* stand ever towards the *North*, or *North-East*. Some *Roots* are *Yellow*, as *Carrets*; And some *Plants* *Bloud-Red*, *Stalke* and *Leafe*, and all; as *Amaranthus*. Some *Herbes* incline to *Purple*, and *Red*; As a *Kinde of Sage* doth, and a *Kinde of Mint*, and *Rosa Solis*, &c. And some have *White Leaves*, as another *Kinde of Sage*, and another *Kinde of Mint*; But *Azure*, and a *Faire Purple*, are never found in *Leaves*. This sheweth, that *Flowers* are made of a *Refined Juyce*, of the *Earth*; And so are *Fruits*; But *Leaves* of a more *Course*, and *Common*.

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It is a *Curiosity* also to make *Flowers Double*; Which is effected by Often *Removing* them into *New Earth*; As on the contrary Part, *Double Flowers*, by neglecting, and not *Removing*, prove *Single*. And the Way to doe it speedily, is to sow or set *Seeds*, or *Slips of Flowers*; And as soone as they come up, to remove them into new *Ground*, that is good. Enquire also, whether *inoculating of Flowers*, (as *Stock-Gilly-Flowers*, *Roses*, *Munke-Roses*, &c.) doth not make them *Double*. There is a *Cherry-Tree*, that hath *Double Blossomes*; But that *Tree* beareth no *Fruit*; And, it may bee, that the same *Meanes*, which applied to the *Tree*, doth extremely accelerate the *Sap* to rise, and *Breake forth*; Which would make the *Tree* spend it selfe in *Flowers*, and those to become *Double*; Which were a great pleasure to see; Especially in *Apple-Trees*, *Peach-Trees*, and *Almond-Trees*, that have *Blossomes* *Blush-Coloured*.

514

The *Making of Fruits*, without *Core* or *Stone*, is likewise a *Curiosity*; And somewhat better: Because whatsoever maketh them so, is like to make them more *Tender* and *Delicate*. If a *Cions* or *Shoot*, fit to be set in the *Ground*, have the *Pith* finely taken forth, (and not altogether, but some of it left, the better to save the life,) it will beare a *Fruit* with little, or no *Core*, or *Stone*. And the like is said to bee, of dividing a *Quick-Tree* downe to the *Ground*, and *Taking out the Pith*, and then binding it up againe.

It

It is reported also, that a *Citron* grafted upon a *Quince*, will have small or no *Seeds*; And it is very probable, that any *Sowre Fruit*, grafted upon a *Stocke*, that beareth a *Sweeter Fruit*, may both make the *Fruit* sweeter, and more void of the harsh Matter of *Kernells* or *Seeds*.

It is reported, that not only the *Taking out* of the *Pith*, but the *Stopping* of the *Iuyce* of the *Pith*, from *Rising* in the *Middest*, and *Turning* it to rise on the *Outside*, will make the *Fruit* without *Core*, or *Stone*; As if you should boare a *Tree* cleane thorow, and put a wedge in. It is true, there is some *Affinitie* betweene the *Pith* and the *Kernell*, because they are both of a harsh *Substance*, and both placed in the *Middest*.

It is reported that *Trees* watered perpetually with *Warne Water*, will make a *Fruit*, with little or no *Core* or *Stone*. And the Rule is generall, that whatsoever will make a *wilde-Tree* a *Garden-Tree*, will make a *Garden-Tree* to have lesse *Core*, or *Stone*.

THE Rule is certaine, that *Plants* for want of *Culture*, degenerate to be baser in the same *Kinde*; And sometimes so farre, as to change into another *Kinde*. 1. The *Standing long*, and not being *Removed*, maketh them degenerate. 2. *Droughts*, unlesse the *Earth* of it selfe be moist, doth the like. 3. So doth *Removing* into worse *Earth*, or *Forbearing* to compost the *Earth*; As wee see that *Water-Mint* turneth into *Field Mint*; And the *Coleworts* into *Rapo* by *Neglect*, &c.

Whatsoever *Fruit* useth to bee set upon a *Root*, or a *Slip*, if it bee sowne, will degenerate. *Grapes* sowne; *Figs*, *Almonds*, *Pomgranate Kernells* sowne; make the *Fruits* degenerate, and become *Wilde*. And againe, Most of those *Fruits* that use to bee grafted, if they be set of *Kernells*, or *Stones*, degenerate. It is true, that *Peaches*, (as hath beene touched before,) doe better upon *Stones* set, than upon *Grafting*: And the Rule of Exception should seeme to bee this; That whatsoever *Plant* requireth much *Moisture*, prospereth better upon the *Stone*, or *Kernell*, than upon the *Graft*. For the *Stocke*, though it giveth a finer *Nourishment*, yet it giveth a scantier, than the *Earth* at large.

Seeds, if they bee very old, and yet have strength enough to bring forth a *Plant*, make the *Plant* degenerate. And therefore skilfull *Gardiners* make trial of the *Seeds*, before they buy them, whether they be good or no, by Putting them into *Water* gently *Boyled*; And if they be good, they will sprout within halfe an *Hour*.

It is strange which is reported, that *Basill* too much exposed to the *Sunne*, doth turne into *Wilde Time*: Although those two *Herbes* seeme to have small *Affinitie*; but *Basill* is almost the only *Hot Herbe*, that hath *Fat* and *Succulent Leaves*; Which *Oyliness*, if it bee drawne forth by the *Sunne*, it is like it will make a very great *Change*.

There is an old *Tradition*, that *Boughs of Oake*, put into the *Earth*, will put forth *wilde Vines*: Which if it be true, (no doubt,) it is not the *Oake* that turneth into a *Vine*, but the *Oake-Bough* *Putrifying*, qualifieth the *Earth*, to put forth a *Vine* of it selfe.

515

516

517

Experiments
in Consort,
touching the
Degenerating
of Plants; And
of the Trans-
mutation of
them, one into
another.

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It

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It is not impossible, and I have heard it verified, that upon Cutting downe of an Old Timber-Tree, the Stub hath put out sometimes a Tree of another Kinde; As that Beech hath put forth Birch; Which, if it bee true, the Cause may be, for that the old Stub is too scant of Juyce, to put forth the former Tree; And therefore putteth forth a Tree of a smaller kinde, that needeth lesse Nourishment.

524

There is an Opinion in the Countrey, that if the same Ground be oft sown, with the Graine that grew upon it, it will, in the end, grow to be of a baser kinde.

525

It is certaine, that in very Sterile Yeares, Corne somnewill grow to an other Kinde.

Grandia sepe quibus mandavimus Hordea Sulcis,

Infelix Lolium, & steriles dominantur Avena.

And generally it is a Rule, that Plants, that are brought forth by Culture, as Corne, will sooner change into other Species, than those that come of themselves: For that Culture giveth but an Adventitious Nature, which is more easily put off.

This worke of the Transmutation of Plants, one into another, is inter Magnalia Naturæ: For the Transmutation of Species is, in the vulgar philosophie, pronounced Impossible: And certainly, it is a thing of difficultie, and requireth deepe Search into Nature: But seeing there appeare some manifest Instances of it, the Opinion of Impossibilitie is to be rejected; And the Meanes thereof to bee found out. Wee see, that in Living Creatures, that come of Putrefaction, there is much Transmutation, of one into another; As Catterpillers turne into Flies, &c. And it should seeme probable, that whatsoever Creature, having life, is generated without Seed, that Creature will change out of one Species into another. For it is the Seed, and the Nature of it, which locketh and boundeth in the Creature, that it doth not expatiate. So as we may well conclude, that seeing the Earth, of it selfe, doth put forth Plants, without Seed, therefore Plants may well have a Transmigration of Species. Wherefore wanting Instances, which doe occurre, wee shall give Directions of the most likely Trialls: And generally, wee would not have those, that read this our Work of Sylva Sylvarum, account it strange, or think that it is an Over-Haste, that wee have set downe Particulars untried; For contrariwise, in our owne Estimation, we account such Particulars, more worthy, than those that are already

ready tried and knowne. For these Later must bee taken as you finde them; But the Other doe leuell Point blanke at the Inventing of Causes, and Axiomes.

First therefore you must make account, that if you will have one Plant change into another, you must have the Nourishment over-rule the Seed; And therefore you are to practise it by Nourishment as contrary, as may be, to the Nature of the Herbe. So nevertheless as the Herbe may grow; And likewise with Seeds that are of the Weakest Sort, and have least Vigour. You shall doe well therefore, to take Marsh-Herbs, and Plant them upon Tops of Hills, and Champaignes; And such Plants as require much Moisture, upon Sandy and very drie Grounds. As for Example, Marsh-Mallows, and Sedge, upon Hills; Cucumber and Lettuce-Seeds, and Coleworts, upon a Sandy Plot. So contrariwise plant Busbes, Heath, Ling, and Brakes, upon a Wet or Marshy Ground. This I conceive also, that all Esculent and Garden-Herbs, set upon the Tops of Hills, will prove more Medicinall, though lesse Esculent, than they were before. And it may be likewise, some wilde Herbs you may make Sallet-Herbs. This is the first Rule for Transmutation of Plants.

The second Rule shall bee to burie some few Seeds, of the Herbe you would change, amongst other Seeds; And then you shall see, whether the Juyce of those other Seeds, doe not so qualifie the Earth, as it will alter the Seed, whereupon you worke. As for Example; Put Parsley-Seed amongst Onion-Seed; Or Lettuce-Seed amongst Parsley-Seed; Or Basil-Seed amongst Thyme-Seed; And see the Change of Taste, or otherwise. But you shall doe well, to put the Seed you would change, into a little linnen Cloth, that it mingle not with the forraine Seed.

The third Rule shall bee, the Making of some Medley or Mixture of Earth, with some other Plants Bruised, or Shaven, either in Lease or Root: As for Example, make Earth with a Mixture of Colewort-Leaves, stamped, and set in it Artichokes, or Parsnips; So take Earth made with Majoram, or Origanum, or Wilde-Thyme, bruised, or stamped, and set in it Fennell-Seed, &c. In which Operation, the Proesse of Nature still will bee, (as I conceive,) not that the Herbe you worke upon, should draw the Juyce of the Forraine Herbe; (For that Opinion wee have formerly rejected;) But that there will bee a New Confection of Mould, which perhaps will alter the Seed, and yet not to the kinde of the former Herbe.

The fourth Rule shall be, to marke what Herbs, some Earths doe put forth of themselves; And to take that Earth, and to Pot it, or to Vessell it; And in that to set the Seed you would change: As for example, take from under Walls, or the like, where Nettles put forth in abundance, the Earth which you shall there finde, without any String, or Root of the Nettles, And Pot that Earth, and set in it Stock-gilly-flowers, or Wall-Flowers, &c. Or sow in the Seeds of them; And see what the Event will be: Or take Earth, that you have prepared to put forth Musb-

roomes,

comes, of it selfe, (whereof you shall finde some Instances following;) And sow in it *Parflane-seed*, or *Lettuce-seed*; for in these Experiments, it is likely enough, that the *Earth* being accustomed to send forth one Kinde of Nourishment, will alter the new Seed.

330

The fifth Rule shall be, to make the *Herbe* grow Contrary to his Nature; As to make *Ground-Herbes* rise in Height: As for example; Carry *Camomill*, or *Wild Thyme*, or the *Greene Strawberry*, upon Sticks, as you doe *Hops* upon Poles; And see what the Event will be.

531

The sixth Rule shall be, to make *Plants* grow out of the *Sunne*, or open *Aires*; For that is a great Mutation in Nature; And may induce a Change in the seed: As barrell up *Earth*; and sow some Seed in it; and put it in the Bottom of a Pond; Or put it in some great hollow Tree; Trye also the Sowing of seeds, in the Bottomes of Caves; And Pots with seeds sowne, hanged up in Wells, some distance from the Water, and see what the Event will be.

Experiments
in Consort
touching the
Proceritie, and
Lownesse, and
Artificiall
dwarfing of
Trees.

532

It is certaine, that *Timber-Trees* in *Coppice-woods*, grow more upright, and more free from Under-Boughs, than those that stand in the Field. The Cause whereof is, for that *Plants* have a Naturall Motion, to get to the *Sunne*; And besides, they are not glutted with too much Nourishment; For that the *Coppice* thareth with them; And Repletion ever hindreth Stature; Lastly, they are kept warme; And that ever in *Plants* helpeth Mounting.

533

There, that are, of themselves, full of Heat; (which Heat appeareth by their Inflammable Gums) As *Firs*, and *Pines*, mount of themselves in Height without Side-Boughs, till they come towards the Top. The Cause is, partly Heat; And partly Tenuity of Juyce; Both which send the Sap upwards. As for *Juniper*, it is but a Shrub, and groweth not bigge enough in Body, to maintaine a tall Tree.

534

It is reported, that a Good Strong *Canvas*, spread over a Tree grafted low, soone after it putteth forth, will dwarfse it, and make it spread. The Cause is plaine; For that all Things that grow, will grow as they finde Roome.

535

Trees are generally set of *Roots*, or *Kernells*; But if you set them of *Slips*, (as of some Trees you may, by name the *Mulberry*;) some of the *Slips* will take; And those that take, (as is reported,) will bee Dwarfse-Trees. The Cause is, for that a *Slip* draweth Nourishment more weakly, than either a *Root*, or *Kernell*.

536

All *Plants*, that put forth their Sap hastily, have their Bodies not proportionable to their Length; And therefore they are *winders*, and *Cree-pers*; As *Iuy*, *Briony*, *Hops*, *Woodbine*: Whereas Dwarfing requirerh a slow Putting forth, and lesse Vigour of Mounting.

Experiments
in Consort,
touching the

The Scripture saith, that *Salomon* wrote a *Naturall History*, from the *Cedar of Libanus*, to the *Mosse* growing upon the Wall:

For

For so the best *Translations* have it. And it is true that *Mosse* is but the *Rudiment* of a *Plant*; And (as it were) the *Mould* of *Earth*, or *Barke*.

Rudiments of
Plants, and of
the Excrescen-
ces of Plants,
or Super-
Plants.

Mosse groweth chiefly upon *Ridges* of *Houses*, tiled or thatched; And upon the *Crests* of *Walls*. And that *Mosse* is of a lightsome, and pleasant *Greene*. The Growing upon *Slopes* is caused, for that *Mosse*, as one the one side it commeth of *Moisture* and *Water*, so on the other side the *Water* must but *Slide*, and not *Stand* or *Poole*. And the Growing upon *Tiles*, or *Walls*, &c. is caused, for that those dried *Earths*, having not *Moisture* sufficient to put forth a *Plant*, doe practise *Germination* by Putting forth *Mosse*; Though when by *Age*, or otherwise, they grow to relent and resolve, they sometimes put forth *Plants*; As *Wall-Flowers*. And almost all *Mosse* hath here and there little *Stalkes*, besides the low *Thrumme*.

537

Mosse groweth upon *Alleyes*, especially such as lye *Cold*, and upon the *North*; As in divers *Tarrasses*: And againe, if they be much trodden; Or if they were, at the first, gravelled; For wheresoever *Plants* are kept downe, the *Earth* putteth forth *Mosse*.

538

Old Ground, that hath beene long unbroken up, gathereth *Mosse*: And therefore *Husbandmen* use to cure their *Pasture Grounds*, when they grow to *Mosse*, by *Tilling* them for a yeare, or two: Which also dependeth upon the same *Cause*; For that, the more *Sparing* and *Starving* Iuyce of the *Earth*, insufficient for *Plants*, doth breed *Mosse*.

539

Old Trees are more *Mossie*, (farre) than *Young*; For that the *Sap* is not so frank as to rise all to the *Boughes*, but tireth by the way, and putteth out *Mosse*.

540

Fountaines have *Mosse* growing upon the *Ground* about them;

541

Muscosi Fontes;

The *Cause* is, for that the *Fountaines* draine the *Water* from the *Ground* *Adjacent*, and leave but sufficient *Moisture* to breed *Mosse*: And besides, the *Coldnesse* of the *Water* conduceth to the same.

The *Mosse* of *Trees*, is a kinde of *Haire*; For it is the Iuyce of the *Tree*, that is *Excerned*, and doth not *Assimilate*. And upon great *Trees* the *Mosse* gathereth a *Figure*, like a *Leafe*.

542

The *Moister Sort* of *Trees* yeeld little *Mosse*; As wee see in *Asps*, *Poplars*, *Willowes*, *Beeches*, &c. Which is partly caused, for the Reason that hath beene given, of the francke Putting up of the *Sap* into the *Boughs*; And partly, for that the *Barks* of those *Trees*, are more *Close* and *Smooth*, than those of *Oakes*, and *Ashes*; Whereby the *Mosse* can the hardlier issue out.

543

In *Clay-Grounds*, all *Fruit-Trees* grow full of *Mosse*, both upon *Body* and *Boughs*; Which is caused, partly by the *Coldnesse* of the *Ground*, whereby the *Plants* nourish lesse; And partly by the *Toughnesse* of the *Earth*, whereby the *Sap* is shut in, and cannot get up, to spread so franckly, as it should doe.

544

545

Wee have said heretofore, that if *Trees* be *Hide-bound*, they wax lesse Fruitfull, and gather *Mosse*: And that they are holpen by *Hacking*, &c. And therefore by the Reason of Contraries, if *Trees* be bound in with *Cords*, or some Outward *Bands*, they will put forth more *Mosse*: Which (I thinke) happeneth to *Trees* that stand Bleake, and upon the Cold Winds. It would also be tried, whether, if you cover a *Tree*, somewhat thick upon the top, after his *Powling*, it will not gather more *Mosse*. I thinke also, the *Watring* of *Trees* with Cold *Fountaine-water*, will make them grow full of *Mosse*.

546

There is a *Mosse* the *Perfumers* have, which commeth out of *Apple-Trees*, that hath an Excellent Sent. *Quere* particularly for the *Manner* of the *Growth*, and the *Nature* of it. And for this *Experiments* sake, being a Thing of Price, I have set downe the last *Experiments*, how to multiply, and call on *Mosses*.

Next unto *Mosse*, I will speake of *Mushromes*; Which are likewise an *Vnperfect Plant*. These *Mushromes* have two strange *Properties*; The One, that they yeeld so *Delicious* a *Meat*; The other, that they come up so *hastily*; As in a *Night*; And yet they are *Vnsowne*. And therefore, such as are *Upstarts* in State, they call, in reproch, *Mushromes*. It must needs be therefore, that they be made of much *Moisture*; And that *Moisture* Fat, *Grosse*, and yet somewhat *Concocted*. And (indeed) we finde, that *Mushromes* cause the *Accident*, which we call *Incubus*, or the *Mare*, in the *Stomacke*. And therefore the *Surfet* of them may *Suffocate*, and *Empoyson*. And this sheweth, that they are *Windy*; And that *Windinesse* is *Grosse*, and *Swelling*; Not *Sharp*, or *Griping*. And upon the same reason *Mushromes* are a *venereous Meat*.

547

It is reported, that the *Burke* of *White*, or *Red Poplar*, (which are of the *Moistest* of *Trees*.) cut small, and cast into *Furrowes* well dunged, will cause the *Ground* to put forth *Mushromes*, at all *Seasons* of the *Yeare*, fit to be eaten. Some adde to the *Mixture* *Leaven* of *Bread*, resolved in *Water*.

548

It is reported, that if a *Hilly-Field*, where the *Stubble* is standing, be set on *Fire*, in a *Showrie Season*, it will put forth great *Store* of *Mushromes*.

549

It is reported, that *Harts-Horne*, *Shaven*, or in *Small Peeces*, mixed with *Dung*, and *watred*, putteth up *Mushromes*. And wee know *Harts-Horne* is of a *Fat* and *Clammie Substance*: And it may be *Oxe-Horne* would doe the like.

550

It hath beene reported, though it be scarce credible, that *Ivy* hath growne out of a *Stags-Horne*; Which they suppose, did rather come from

from a *Confrication* of the *Horne* upon the *Ivy*, than from the *Horne* it selfe. There is not knowne any Substance, but *Earth*, and the *Procedures* of *Earth*, (as *Tile*, *Stone*, &c.) that yeeldeth any *Mosse*, or *Herby Substance*. There may be *Triall* made of some *Seeds*, as that of *Fennell-Seed*, *Mustard-Seed*, and *Rape-Seed*, put into some little *Holes*, made in the *Hornes* of *Stags*, or *Oxen*, to see if they will grow.

There is also another *Vnperfect Plant*, that (in shew) is like a great *Mushrome*: And it is sometimes as broad as ones *Hat*; Which they call a *Toads-Stoole*: But it is not *Esculent*; And it groweth (commonly) by a dead *Stub* of a *Tree*; And likewise about the *Roots* of *Rotten Trees*: And therefore seemeth to take his *Iuyce* from *Wood Putrified*. Which sheweth, by the way, that *Wood Putrified* yeeldeth a franke *Moisture*.

There is a *Cake*, that groweth upon the *Side* of a *Dead Tree*, that hath gotten no *Name*, but it is large, and of a *Chesnut Colour*, and hard, and pithy; Whereby it should seeme, that even *Dead Trees* forget not their *Putting forth*; No more than the *Carcasses* of *Mens Bodies*, that put forth *Haire*, and *Nails*, for a *Time*.

There is a *Cod*, or *Bag*, that groweth commonly in the *Fields*; That at the first is hard like a *Tennis-Ball*, and white; And after groweth of a *Mushrome Colour*, and full of light *Dust* upon the *Breaking*: And is thought to be dangerous for the *Eyes*, if the *Powder* get into them; And to be good for *Kibes*. Belike it hath a *Corrosive*, and *Fretting Nature*.

There is an *Herb* called *Iewes-Eare*, that groweth upon the *Roots*, and *Lower Parts* of the *Bodies* of *Trees*; Especially of *Elders*, and sometimes *Ashes*. It hath a strange *Propertie*; For in *Warne water*, it swel- leth, and openeth extremely. It is not greene, but of a duskie browne Colour. And it is used for *Squinancies*, and *Inflammations* in the *Throat*; Whereby it seemeth to have a *Mollifying*, and *Lenifying Vertue*.

There is a *Kinde* of *Spongie Excrecence*, which groweth chiefly upon the *Roots* of the *Laser-Tree*; And sometimes upon *Cedar*, and other *Trees*. It is verie *White*, and *Light*, and *Friable*: Which wee call *Agarick*. It is famous in *Physicke* for the *Purging* of *Tough flegme*. And it is also an excellent *Opener* for the *Liver*: But *Offensive* to the *Stomack*; And in *Taste* it is, at the first, *Sweet*, and after *Bitter*.

We finde no *Super-Plant*, that is a *Formed Plant*, but *Misseltoe*. They have an idle *Tradition*, that there is a *Bird*, called a *Missel-Bird*, that feedeth upon a *Seed*, which many times shee cannot digest, and so expel- leth it whole with her *Excrement*: which falling upon a *Bough* of a *Tree*, that hath some *Rift*, putteth forth the *Misseltoe*. But this is a *Fable*: For it is not probable, that *Birds* should feed upon that they cannot digest. But allow that, yet it cannot be for other *Reasons*: For First, it is found but upon certaine *Trees*; And those *Trees* beare no such *Fruit*, as may al- lure that *Bird* to sit, and feed upon them. It may be, that *Bird* feederh upon the *Misseltoe-Berries*, and so is often found there; Which may have given occasion to the *Tale*. But that which maketh an End of the *Que- stion*,

frion, is, that *Misseltœ* hath beene found to put forth under the *Boughes*, and not (onely) above the *Boughes*: So it cannot be any Thing that falleth upon the *Bough*. *Misseltœ* groweth chiefly upon *Crab-Trees*, *Apple-Trees*, sometimes upon *Hawes*; And rarely upon *Oakes*; The *Misseltœ* whereof is counted verie *Medicinall*. It is ever greene, Winter and Summer; And beareth a *White Glistering Berry*: And it is a *Plant*, utterly differing from the *Plant*, upon which it groweth. Two things therefore may be certainly set downe: First, that *Super-fetation* must be by *Abundance* of *Sap*, in the *Bough* that putteth it forth: Secondly, that that *Sap* must be such, as the *Tree* doth exerce, and cannot assimilate; For else it would goe into a *Bough*; And besides, it seemeth to be more Fat and Unctuous, than the Ordinary *Sap* of the *Tree*; Both by the *Berry*, which is *Clammie*. And by that it continueth greene, Winter and Summer, which the *Tree* doth not.

557

This Experiment of *Misseltœ* may give Light to other Practices. Therefore Triall would be made, by Ripping of the *Bough* of a *Crab-Tree*, in the *Barke*; And *Warring* of the Wound everie Day, with warme *Water Dugged*, to see if it would bring forth *Misseltœ*, or any such like Thing. But it were yet more likely to trie it, with some other *Warring*, or *Anointing*, that were not so Naturall to the *Tree*, as *Water* is; As *Oyle*, or *Barme* of *Drinke*, &c. So they be such Things as kill not the *Bough*.

558

It were good to trie, what *Plants* would put forth, if they be forbidden to put forth their *Naturall Boughes*: Poll therefore a *Tree*, and cover it, some thicknesse, with *Clay* on the Top; And see what it will put forth. I suppose it will put forth *Rootes*; For so will a *Cions*, being turned downe into *Clay*: Therefore, in this Experiment also, the *Tree* would be closed with somewhat, that is not so Naturall to the *Plant*, as *Clay* is. Trie it with *Leather*, or *Cloth*, or *Painting*, so it be not hurtfull to the *Tree*. And it is certaine, that a *Brake* hath beene knowne to grow out of a *Pollard*.

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A Man may count the *Prickles* of *Trees* to be a kinde of *Excrescence*; For they will never be *Boughes*, nor beare *Leaves*. The *Plants* that have *Prickles*, are *Thornes*, blacke and white; *Brier*; *Rose*; *Limon-Trees*; *Crab-Trees*; *Goose-Berry*; *Erberry*; These have it in the *Bough*; The *Plants* that have *Prickles* in the *Leafe*, are; *Holly*; *Iuniper*; *Whin-bush*; *Thistle*; *Nettles* also have a small *Venomous Prickle*; So hath *Borrage*, but harmelesse. The Cause must be *Hastie Putting forth*; *Want of Moisture*; And the *Closenesse* of the *Barke*; For the *Haste* of the *Spirit* to put forth, and the *want* of *Nourishment* to put forth a *Bough*, and the *Closenesse* of the *Barke*, cause *Prickles* in *Boughes*; And therefore they are ever like a *Pyramis*, for that the *Moisture* spendeth after a little *Putting forth*. And for *Prickles* in *Leaves*, they come also of *Putting forth more Iuyce* into the *Leafe*, than can spread in the *Leafe* smooth; And therefore the *Leaves* otherwise are *Rough*, as *Borrage* and *Nettles* are. As for the *Leaves* of *Holly*, they are *Smooth*, but never *Plaine*, but as it were with *Folds*, for the same Cause.

There

There be also *Plants*, that though they have no *Prickles*, yet they have a Kinde of *Downy* or *Velvet* Kine, upon their *Leaves*; As *Rose-Campion*, *Stock Gilly-Flowers*, *Colts-Foot*; which *Downe* or *Nap* commeth of a *Subtile Spirit*, in a *Soft* or *Fat Substance*. For it is certaine, that both *Stock-Gilly-Flowers*, and *Rose-Campions*, stamped, have beene applied, (with successe,) to the *Wrests* of those that have had *Tertian*, or *Quartan Agues*; And the *Vapour* of *Colts-Foot* hath a *Sanative* vertue, towards the *Lungs*; And the *Leafe* also is *Healing* in *Surgerie*.

Another Kinde of *Excrecence* is an *Exudation* of *Plants*, joyned with *Putrefaction*; As we see in *Oake-Apples*, which are found chiefly upon the *Leaves* of *Oakes*; And the like upon *Willowes*: And Countrey People have a kinde of *Prediction*, that if the *Oake-Apple*, broken, be full of *wormes*, it is a *Signe* of a *Pestilent Yeare*; Which is a likely Thing, because they grow of *Corruption*.

There is also upon *Sweet*, or other *Brier*, a fine *Tuft*, or *Brush* of *Mosse*, of divers *Colours*; Which if you cut, you shall ever finde full of little white *Wormes*.

It is certaine, that *Earth* taken out of the *Foundations* of *Vaults* and *Houses*, and *Bottomes* of *Wells*, and then put into *Pots*, will put forth *Sundrie Kinds* of *Herbs*: But some *Time* is required, for the *Germination*; For if it be taken, but from a *Fathome* deepe, it will put forth the *First Yeare*; If much deeper, not till after a *Yeare*, or *Two*.

The *Nature* of the *Plants* growing out of *Earth* so taken up, doth follow the *Nature* of the *Mould* it selfe; As if the *Mould* be *Soft*, and *Fine*, it putteth forth *Soft Herbs*; As *Grasse*, *Plantaine*, and the like; If the *Earth* be *Harder* and *Courser*, it putteth forth *Herbs* more *Rough*, as *Thistles*, *Firres*, &c.

It is *Common Experience*, that where *Alleyes* are close *Gravelled*, the *Earth* putteth forth, the first yeare, *Knot-grasse*, and after *Spire-grasse*. The *Cause* is, for that the *Hard Gravel*, or *Pebble* at the first *Laying*, will not suffer the *Grasse* to come forth upright, but turneth it to finde his way where it can; But after that the *Earth* is somewhat loosened at the *Top*, the *Ordinarie Grasse* commeth up.

It is reported, that *Earth*, being taken out of *shady* and *Watry Woods*, some depth, and *Potted*, will put forth *Herbs* of a *Fat* and *Iuycie Substance*; As *Penny-wort*, *Lurslane*, *Hauslecke*, *Penny-royall*, &c.

The *Water* also doth send forth *Plants*, that have no *Roots* fixed in the *Bottom*; But they are lesse *Perfect Plants*, being almost but *Leaves*, and those *Small ones*: Such is that wee call *Duck-Weed*; Which hath a *Leafe* no bigger than a *Thyme-Leafe*, but of a fresher *Greene*, and putteth forth a little *String* into the *Water*, farre from the *Bottom*. As for the *Water-Lilly*, it hath a *Root* in the *Ground*: And so have a *Number* of other *Herbs* that grow in *Ponds*.

It is reported by some of the *Ancients*, and some *Moderne Testimonie* likewise, that there be some *Plants*, that grow upon the *Top* of the *Sea*;

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Producing of
Perfect Plants
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Being supposed to grow of some Concretion of Slime from the Water, where the Sunne beateh hot, and where the sea stirreth little. As for *Alga Marina*, (*Sea-weed*;) and *Eryngium* (*Sea-Thistle*;) both have Roots; but the *Sea-weed* under the Water, the *Sea-Thistle* but upon the Shore.

The Ancients have noted, that there are some Herbs, that grow out of Snow, laid up close together, and Putrified; And that they are all Bitter; And they name one specially, *Flomus*, which wee call *Moth-Mullein*. It is certaine, that Wormes are found in Snow commonly, like *Earth-Wormes*; And therefore it is not unlike, that it may likewise put forth Plants.

The Ancients have affirmed, that there are some Herbs, that grow out of Stone; Which may be, for that it is certaine, that Toads have been found in the Middle of a Free-Stone. We see also, that *Flints*, lying above Ground, gather Mousse; And *Wall-Flowers*, and some other Flowers, grow upon Walls; But whether upon the Maine Bricke, or Stone, or whether out of the Lime, or Chinks, is not well observed; For *Elders* and *Asbes* have beene seene to grow out of Steeples: But they manifestly grow out of Clefts; In so much as when they grow big, they will disjoine the Stone. And besides it is doubtfull, whether the Mortar it selfe putteth it forth, or whether some Seeds be not let fall by Birds. There be likewise *Rock-Herbs*; But I suppose those are, where there is some Mould or Earth. It hath likewise beene found, that great Trees growing upon Quarries, have put downe their Root into the Stone.

In some Mines in Germany, as is reported, there grow in the Bottome Vegetables; And the Werke-Folks use to say, they have Magicall Vertue; And will not suffer men to gather them.

The Sea-Sands seldome beare Plants. Whereof the Cause is yeelded, by some of the Ancients, for that the Sunne exaleth the Moisture, before it can incorporate with the Earth, and yeeld a Nourishment for the Plants. And it is affirmed also, that Sand hath (alwayes) his Root in Clay; And that there be no Veines of Sand, any great depth within the Earth.

It is certaine, that some Plants put forth for a time, of their owne Store, without any Nourishment from Earth, Water, Stone, &c. Of which Vide the Experiment 29.

It is reported, that Earth, that was brought out of the Indies, and other Remote Countries, for Ballast of Ships, cast upon some Grounds in Italy, did put forth *Ferraine Herbs*, to us in Europe not knowne; And, that which is more, that of their Roots, Barks, and Seeds, confused together, and mingled with other Earth, and well Watred with Warme Water, there came forth Herbs, much like the Other.

Plants brought out of Hot Countries, will endeavour to put forth, at the same Time, that they usually do in their owne Climate; And therefore to preserve them, there is no more required, than to keepe them from the Injurie of Putting back by Cold. It is reported also, that Graine out

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of

of the *Hotter Countries* translated into the *Colder*, will be more forward, than the *Ordinarie Graine* of the *Cold Countrey*. It is likely, that this will prove better in *Graines*, than in *Trees*; For that *Graines* are but *Annuall*; And so the *Virtue* of the *Seed* is not worne out; Whereas in a *Tree*, it is embased by the *Ground*, to which it is *Removed*.

Many *Plants*, which grow in the *Hotter Countries*; being set in the *Colder*, will neverthelesse, even in those *Cold Countries*, being sowne of *Seeds* late in the *Spring*, come up and abide most Part of the *Summer*; As wee finde it in *Orenge*, and *Limon-Seeds*, &c. The *Seeds* whereof, Sowne in the End of *Aprill*, will bring forth *Excellent Sallets*, mingled with other *Herbs*. And I doubt not, but the *Seeds* of *Clove-Trees*, and *Pepper-Seeds*, &c. if they could come hither *Greene* enough to be sowne, would doe the like.

There be some *Flowers*, *Blossomes*, *Graines*, and *Fruits*, which come more *Early*; And Others which come more *Late* in the *Yeare*. The *Flowers* that come early, with us, are; *Prime-Roses*, *Violets*, *Anemonies*, *Water-Daffadillies*, *Crocus Vernus*, and some early *Tulippa's*. And they are all *Cold Plants*; Which therefore, (as it should seeme,) have a quicker *Perception*, of the *Heat* of the *Sunne* Increasing, than the *Hot Herbs* have; As a *Cold Hand* will sooner finde a little *Warmth*, than a *Hot*. And those that come next after, are *Wall-Flowers*, *Cowslips*, *Hyacinths*, *Rose-mary-Flowers*, &c. And after them, *Pincks*, *Roses*, *Flowerdeluccs*, &c. And the latest are *Gilly-Flowers*, *Holly-oakes*, *Larkes-Foot*, &c. The Earliest *Blossomes* are, the *Blossomes* of *Peaches*, *Almonds*, *Cornelians*, *Mezerions*, &c. And they are of such *Trees*, as have much *Moisture*, either *Watry*, or *Oylie*. And therefore *Crocus Vernus* also, being an *Herb*, that hath an *Oylie Iuyce*, putteth forth early. For those also finde the *Sunne* sooner than the *Drier Trees*. The *Graines* are, first *Rye* and *Wheat*; Then *Oats* and *Barley*; Then *Pease* and *Beanes*. For though *Greene Pease* and *Beanes* be eaten sooner, yet the *Drie Ones*, that are used for *Horse-Meat*, are ripe last; And it seemeth that the *Fatter Graine* commeth first. The Earliest *Fruits* are, *Strawberries*, *Cherries*, *Gooseberries*, *Corrans*; And after them *Early Apples*, *Early Peares*, *Apricots*, *Rasss*; And after them *Damasins*, and most Kinde of *Plums*, *Peaches*, &c. And the latest are *Apples*, *Wardens*, *Grapes*, *Nuts*, *Quinces*, *Almonds*, *Sloes*, *Brier-Berries*, *Heps*, *Medlars*, *Services*, *Cornelians*, &c.

It is to be noted, that (commonly) *Trees* that ripen latest, blossom soonest: As *Peaches*, *Cornelians*, *Sloes*, *Almonds*, &c. And it seemeth to be a *Worke* of *Providence*, that they blossom so soone; For otherwise, they could not have the *Sunne* long enough to ripen.

There be *Fruits*, (but rarely,) that come twice a *Yeare*; as some *Peares*, *Strawberries*, &c. And it seemeth they are such, as abound with *Nourishment*; Whereby after one *Period*, before the *Sunne* waxeth too weake, they can endure another. The *Violet* also, amongst *Flowers*, commeth twice a *Yeare*; Especially the *Double White*; And that also

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Seasons in
which Plants
come forth.

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is a Plant full of Moisture. *Roses* come twice, but it is not without Cutting, as hath beene formerly said.

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In *Muscovia*, though the *Corne* come not up, till late *Spring*, yet their *Harvest* is as Early as Ours. The Cause is, for that the *Strength* of the *Ground* is kept in with the *Snow*; And wee see with us, that if it be a long *Winter*, it is commonly a more *Pleentifull* *Yeare*: And after those kinde of *Winters* likewise, the *Flowers*, and *Corne*, which are Earlier, and Later, doe come commonly at once, and at the same time; Which troubleth the *Husbandmen* many times; For you shall have *Red Roses*, and *Damask Roses*, come together; And likewise the *Harvest* of *wheat* and *Barley*. But this happeneth ever, for that the Earlier stayeth for the Later; And not that the Later commeth sooner.

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There be divers *Fruit-Trees*, in the *Hot Countries*, which have *Blossomes*, and *Young Fruit*, and *Ripe Fruit*, almost all the *Yeare*, succeeding one another. And it is said, the *Orange* hath the like with us, for a great Part of *Summer*; And so also hath the *Figge*. And no doubt, the *Naturall Motion* of *Plants*, is to have so; But that either they want *Iuyce* to spend; Or they meet with the *Cold* of the *Winter*: And therefore this *Circle* of *Ripening* cannot be, but in *Succulent Plants*, and *Hot Countries*.

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Some *Herbs* are but *Annually*, and die, *Root* and all, once a *Yeare*; As *Borage*, *Lettuce*, *Cucumbers*, *Muske-Melons*, *Basill*, *Tobacco*, *Mustard-Seed*, and all kinde of *Corne*; Some continue many *Yeares*; As *Hyssope*, *Germander*, *Lavander*, *Fennell*, &c. The Cause of the *Dying* is double; The first is the *Tendernesse* and *weaknesse* of the *Seed*, which maketh the *Period* in a small time; As it is in *Borage*, *Lettuce*, *Cucumbers*, *Corne*, &c. And therefore none of these are *Hot*. The other Cause is, for that some *Herbs* can worle endure *Cold*; As *Basill*, *Tobacco*, *Mustard-Seed*. And these have (all) much *Heat*.

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in Confort
touching the
Lasting of
Herbs and
Trees.

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THE *Lasting* of *Plants* is most in those that are *Largest* of *Body*; As *Oakes*, *Elme*, *Chest-Nut*, the *Loat-Tree*, &c. And this holdeth in *Trees*; But in *Herbs* it is often contrarie; For *Borage*, *Colewort*, *Pompions*, which are *Herbs* of the *Largest* *Size*, are of small *Durance*; Whereas *Hyssope*, *Winter-Savoury*, *Germander*, *Thyme*, *Sage*, will last long. The Cause is, for that *Trees* last according to the *Strength*, and *Quantitie* of their *Sap* and *Iuyce*; Being well munit by their *Barke* against the *Injuries* of the *Aire*; But *Herbs* draw a *Weake Iuyce*; And have a soft *Stalke*; And therefore those amongst them which last longest, are *Herbs* of *Strong Smell*, and with a *Sticke Stalke*.

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Trees that beare *Mast*, and *Nuts*, are commonly more lasting, than those that beare *Fruits*; Especially the *Moister Fruits*: As *Oakes*, *Beeches*, *Chestnuts*, *Wall-nuts*, *Almonds*, *Pine-Trees*, &c. last longer than *Apples*, *Pears*, *Plums*, &c. The Cause is the *Fatnesse* and *Oglinesse* of the *Sap*; Which ever wasteth lesse, than the more *Warry*.

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Trees, that bring forth their *Leaves* late in the *Yeare*, and cast them likewise late, are more lasting, than those that sprout their *Leaves* Early, or shed

shed them betimes. The Cause is, for that the late *Comming forth* sheweth a *Moisture* more fixed; And the other more loose, and more easily resolved. And the same Cause is, that *Wilde-Trees* last longer than *Garden-Trees*; And in the same kinde, those whose *Fruit* is *Acide*, more than those whose *Fruit* is sweet.

Nothing procureth the *Lasting* of *Trees*, *Bushes*, and *Herbs*, so much, as often *Cutting*: For everie *Cutting* causeth a *Renovation* of the *Iuyce* of the *Plant*; That it neither goeth so farre, nor riseth so faintly, as when the *Plant* is not *Cut*: Insomuch as *Annvall Plants*, if you cut them seasonably, and will spare the use of them, and suffer them to come up still young, will last more *Yeares* than one; As hath beene partly touched; Such as is *Lettuce*, *Purflane*, *Cucumber*, and the like. And for *Great Trees*, we see almost all *Over-growne-Trees*, in *Church-yards*, or neare *Ancient Buildings*, and the like, are *Pollards*, or *Dottards*, and not *Trees* at their full Height.

Some *Experiment* would be made, how by *Art* to make *Plants* more *Lasting*, than their ordinarie *Period*; As to make a *Stalke* of *Wheat*, &c. last a whole yeare. You must ever presuppose, that you handle it so, as the *Winter* killeth it not; For we speake onely of *Prolonging* the *Naturall Period*. I conceive, that the *Rule* will hold; That whatsoever maketh the *Herb* come later, than at his time, will make it last longer time: It were good to trie it, in a *Stalke* of *Wheat*, &c. set in the *Shade*. and encompassed with a *Case* of *Wood*, not touching the *Straw*, to keepe out *Open Aire*.

As for the *Preservation* of *Fruits*, and *Plants*, as well upon the *Tree*, or *Stalke*, as gathered, we shall handle it under the *Title* of *Conservation* of *Bodies*.

THE *Particular Figures* of *Plants* wee leave to their *Descriptions*; But some few Things, in generall, we will observe. *Trees* & *Herbs*, in the *Growing* forth of their *Boughes*, and *Branches*, are not *Figured*, and keep no *Order*. The Cause is, for that the *Sap*, being restrained in the *Rinde*, and *Barke*, breaketh not forth at all; (As in the *Bodies* of *Trees*, and *Stalks* of *Herbs*,) till they begin to branch; And then, when they make an *Eruption*, they breake forth casually, where they finde best way, in the *Barke*, or *Rinde*. It is true, that some *Trees* are more scattered in their *Boughes*; As *Sallow-Trees*, *Warden-Trees*, *Quince-Trees*, *Medlar-Trees*, *Limon-Trees*, &c. Some are more in the forme of a *Pyramis*, and come almost to todd; As the *Peare-Tree*, (which the *Criticks* will have to borrow his name of $\pi\upsilon\rho$, *Fire*,) *Orange-Trees*, *Firre-Trees*, *Service-Trees*, *Lime-Trees*, &c. And some are more spread and broad; As *Beeches*, *Hornebeame*, &c. The rest are more indifferent. The Cause of *Scattering* the *Boughes*, is the *Hastie* breaking forth of the *Sap*; And therefore those *Trees* rise not in a *Body* of any Height, but branch neare the *Ground*. The Cause of the *Pyramis*, is the *Keeping* in of the *Sap*, long before it branch; And the spending of it when it beginneth to branch, by equall degrees. The

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of Plants.

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Spreading is caused by the *Carrying* up of the *Sap*, plentifully, without *Expende*; And then putting it forth speedily, and at once.

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There be divers *Herbs*, but no *Trees*, that may be said to have some kinde of *Order*, in the Putting forth of their *Leaves*: For they have *Joyns*, or *Knuckles*, as it were *Stops* in their *Germination*; As have *Gilly-Flowers*, *Pinks*, *Fennell*, *Corne*, *Reeds*, and *Canes*. The *Cause* whereof is, for that the *Sap* ascendeth unequally, and doth (as it were) tire and stop by the way. And it seemeth, they have some *Clofenesse*, and *Hardnesse* in their *Stalke*, which hindreth the *Sap* from going up, untill it hath gathered into a *Knot*, and so is more urged to put forth. And therefore, they are most of them hollow, when the *Stalke* is dry. As *Fennell-Stalk*, *Stubble*, and *Canes*.

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Flowers have (all) exquisite *Figures*; And the *Flower-Numbers* are (chiefly) *Five*, and *Foure*; As in *Prime-Roses*, *Brier-Roses*, *Single Muske-Roses*, *Single Pinks*, and *Gilly-Flowers*, &c. which have five *Leaves*: *Lillies*, *Flower-de-luces*, *Borage*, *Buglosse*, &c. which have four *Leaves*. But some put forth *Leaves* not Numbred; But they are ever small *Ones*; As *Mary-Golds*, *Trifoile*, &c. Wee see also, that the *Sockets*, and *Supporters* of *Flowers*, are *Figured*; As in the *Five Brethren* of the *Rose*; *Sockets* of *Gilly-Flowers*, &c. *Leaves* also are all *Figured*; Some *Round*, Some *Long*; None *Square*; And many jagged on the *Sides*; Which *Leaves* of *Flowers* seldome are. For I account the *Jagging* of *Pinks*, and *Gilly-Flowers*, to be like the *Inequality* of *Oake-leaves*, or *Vine-leaves*, or the like; But they seldome or never have any small *Purles*.

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touching some
Principall Dis-
ferences in
Plants.

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OF *Plants*, some few put forth their *Blossomes* before their *Leaves*; As *Almonds*, *Peaches*, *Cornelians*, *Black-Thorne*, &c. But most put forth some *Leaves* before their *Blossomes*; As *Apples*, *Pears*, *Plums*, *Cherries*, *White-Thorne*, &c. The *Cause* is, for that those, that put forth their *Blossomes* first, have either an *Acute* and *Sharp Spirit*; (And therefore commonly they all put forth early in the *Spring*, and ripen verie late; As most of the *Particulars* before mentioned;) Or else an *Oily Iuyce*, which is apter to put out *Flowers*, than *Leaves*.

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Of *Plants*, some are *Greene* all *Winter*; Others cast their *Leaves*. There are *Greene* all *Winter*; *Holly*, *Ivy*, *Box*, *Firre*, *Eugh*, *Cypresse*, *Iuniper*, *Bayes*, *Rose-Mary*, &c. The *Cause* of the *Holding Greene*, is the *Close* and *Compact Substance* of their *Leaves*, and the *Pedicles* of them. And the *Cause* of that againe, is either the *Tough* and *Viscous Iuyce* of the *Plant*; Or the *Strength* and *Heat* thereof. Of the first Sort is *Holly*; Which is of so *Viscous* a *Iuyce*, as they make *Birdlime* of the *Barke* of it. The *Stalke* of *Ivy* is *Tough*, and not *Fragile*, as wee see in other small *Twigs* dry. *Firre* yeeldeth *Pitch*. *Box* is a fast and heavie *Wood*, as we see it in *Boules*. *Eugh* is a *Strong* and *Tough Wood*, as we see it in *Bowes*. Of the second Sort is *Iuniper*, which is a *Wood* *Odorate*, and maketh a hot *Fire*. *Bayes* is likewise a *Hot* and *Aromaticall Wood*; And so is *Rose-Mary* for a *Shrub*. As for the *Leaves*, their *Densitie* appeareth, in that, either they are *Smooth* and

and Shining, as in *Bayes*, *Holly*, *Ivy*, *Box*, &c. Or in that they are Hard and Spirie, as in the rest. And Triall would be made of *Grafting* of *Rose-Marie*, and *Bayes*, and *Box*, upon a *Holly-stocke*; Because they are *Plants* that come all *Winter*. It were good to trie it also with *Grafts* of other *Trees*, either *Fruit-Trees*, or *Wilde-Trees*; To see whether they will not yeeld their *Fruit*, or beare their *Leaves*, later, and longer in the *Winter*; because the *Sap* of the *Holly* putteth forth most in the *Winter*. It may be also a *Mezerion-Tree*, grafted upon a *Holly*, will prove both an *Earlier*, and a *Greater Tree*.

There be some *Plants*, that beare no *Flower*, and yet beare *Fruit*: There be some, that beare *Flowers*, and no *Fruit*: There be some that beare neither *Flowers*, nor *Fruit*. Most of the great *Timber-Trees*, (as *Oakes*, *Beeches*, &c.) beare no apparent *Flowers*: Some few (likewise) of the *Fruit-Trees*; As *Mulberrie*, *Wall nut*, &c. And some *Shrubs*, (as *Juniper*, *Holly*, &c.) beare no *Flowers*. Divers *Herbs* also beare *Seeds*, (which is as the *Fruit*,) and yet beare no *Flowers*; As *Purslane*, &c. Those that beare *Flowers* and no *Fruit*, are few; As the *Double Cherrie*, the *Sallow*, &c. But for the *Cherrie*, it is doubtfull, whether it be not by *Art*, or *Culture*; For if it be by *Art*, then Triall would be made, whether *Apples*, and other *Fruits Blossomes*, may not be doubled. There are some Few, that beare neither *Fruit*, nor *Flower*; As the *Elme*, the *Poplars*, *Box*, *Brakes*, &c.

There be some *Plants*, that shoot still upwards, and can Support themselves; As the greatest Part of *Trees* and *Plants*: There be some Other, that Creepe along the *Ground*; Or *Winde* about other *Trees*, or *Props*, and cannot support themselves; As *Vines*, *Ivy*, *Briar*, *Briomy*, *Wood-bines*, *Hop's*, *Climatis*, *Camomill*, &c. The Cause is, (as hath beene partly touched,) for that all *Plants*, (naturally) move upwards; But if the *Sap* put up too fast, it maketh a slender *Stalke*, which will not support the weight: And therefore these latter Sort are all *Swift* and *Hastie* *Commers*.

THE first and most Ordinarie *Helpe* is *Stercoration*. The *Sheeps-Dung* is one of the best; And next, the *Dung* of *Kine*: And thirdly, that of *Horses*: Which is held to be somewhat too hot, unlesse it be mingled. That of *Pigeons* for a *Garden*, or a small *Quantitie* of *Ground*, excelleth. The *Ordering* of *Dung* is; If the *Ground* be *Arable*, to spread it immediately before the *Ploughing* and *Sowing*; And so to *Plough* it in: For if you spread it long before, the *Sunne* will draw out much of the *Fatnesse* of the *Dung*: If the *Ground* be *Grazing Ground*, to spread it somewhat late, towards *Winter*; That the *Sunne* may have the lesse *Power* to drie it up. As for speciall *Composts* for *Gardens*, (as a *Hot Bed*, &c.) wee have handled them before.

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touching all
Manner of
Composts, and
Helps of
Ground.

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The Second Kind of *Compost*, is the spreading of divers Kinds of *Earth*; As *Marle*, *Chalke*, *Sea-Sand*, *Earth* upon *Earth*, *Pond-Earth*; And the *Mixtures* of them, *Marle* is thought to be the best; As having most *Fatnesse*; And

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And not Heating the *Ground* too much. The next is *Sea-Sand*; Which (no doubt) obtaineth a speciall Vertue, by the *Salt*: For *Salt* is the first Rudiment of life. *Chalk* over-heateth the *Ground* a little. And therefore is best upon *Cold Clay-Grounds*, or *Moist Grounds*: But I heard a great *Huband* say, that it was a common Errour, to thinke that *Chalk* helpeth *Arable Grounds*, but helpeth not *Grazing Grounds*; Whereas (indeed) it helpeth *Grasse*, as well as *Corne*: but that which breedeth the Errour is, because after the *Chalking* of the *Ground*, they weare it out with many *Crops*, without Rest; And then (indeed) afterwards it will beare little *Grasse*, because the *Ground* is tired out. It were good to trie the laying of *Chalke* upon *Arable Grounds*, a little while before *Ploughing*; And to *Plough* it in, as they doe the *Dung*; But then it must be friable first, by *Raine*, or *Lying*: As for *Earth*, it *Compasseth* it Selfe; For I knew a *Great Garden*, that had a *Field* (in a manner) powred upon it; And it did beare *Fruit* excellently the first yeare of the *Planting*: For the *Surface* of the *Earth* is ever the *Fruitfullest*. And *Earth* so prepared hath a double *Surface*. But it is true, as I conceive, that such *Earth*, as hath *Salt-Petre* bred in it, if you can procure it without too much charge, doth excell. The way to hasten the *Breeding* of *Salt-Petre*, is to forbid the *Sunne*, and the *Growth* of *Vegetables*. And therefore, if you make a large *Hovell*, thatched, over some *Quantitie* of *Ground*; Nay if you doe but *Planck* the *Ground* over, it will breed *Salt-Petre*. As for *Pond-Earth*, or *River-Earth*, it is a verie good *Compost*; Especially if the *Pond* have been long unclesed, and so the *Water* be not too *Hungrie*: And I judge it will be yet better, if there be some *Mixture* of *Chalke*.

The Third *Help* of *Ground*, is, by some other *Substances*, that have a Vertue to make *Ground* Fertile; though they be not meere *Earth*: wherein *Asbes* excell; In so much as the *Countries* about *Aetna*, and *Vesuvius*, have a kinde of *Amends* made them, for the *Mischiefe* the *Eruptions* (many times) doe, by the exceeding *Fruitfulnesse* of the *soile*, caused by the *Asbes*, scattered about. *Soot* also, though thin spred, in a *Field*, or *Garden*, is tried to be a verie good *Compost*. For *Salt*, it is too *Costly*: But it is tried, that mingled with *Seed-Corne*, and sowed together, it doth good: And I am of Opinion, that *Chalke* in Powder, mingled with *Seed-Corne*, would doe good; Perhaps as much as *Chalking* the *Ground* allover. As for the *Steeping* of the *Seeds*, in severall *Mixtures* with *Water*, to give them *Vigour*; Or *Watring* *Grounds* with *Compost-Water*; We have spoken of them before.

The Fourth *Help* of *Ground*, is, the *Suffering* of *Vegetables* to dye into the *Ground*; And so to Fatten it; As the *stubble* of *Corne*, Especially *Pease*. *Brakes* cast upon the *Ground*, in the beginning of *Winter*, will make it verie *Fruitfull*. It were good (also) to trie, whether *Leaves* of *Trees* swept together, with some *Chalke* and *Dung* mixed, to give them more *Heart*, would not make a good *Compost*: For there is nothing lost, so much as *Leaves* of *Trees*; And as they lye scattered, and without *Mixture*, they rather make the *Ground* soure, than otherwise.

The

The Fifth *Helpe* of *Ground*, is *Heat* and *Warmth*. It hath beene anciently practised to burne *Heath*, and *Ling*, and *Sedge*, with the vantage of the *Wind*, upon the *Ground*: Wee see, that *Warmth* of *Walls* and *Enclosures*, menderth *Ground*: Wee see also that *Lying open* to the *South*, menderth *Ground*: Wee see againe, that the *Foldings* of *Sheepe* helpe *Ground*, as well by their *Warmth*, as by their *compost*: And it may bee doubted, whether the *Covering* of the *Ground* with *Brakes*, in the Beginning of the *Winter*, (whereof wee spake in the last *Experiment*,) helpeth it not, by reason of the *Warmth*. Nay some very good *Husbands* doe suspect, that the *Gathering up* of *Flints*, in *Flinty Ground*, and *Laying* them on *Heapes*, (which is much used,) is no good *Husbandry*; For that they would keep the *Ground* warme.

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The Sixth *Helpe* of *Ground* is, by *Watering*, and *Irrigation*; which is in two Manners: The one by *Letting in*, and *Shutting out waters*, at seasonable Times: For *Water*, at some Seasons, and with reasonable stay, doth good; But at some other Seasons, and with too long Stay, doth hurt. And this serveth onely for *Meadowes*, which are along some *River*. The other way is, to bring *Water*, from some *Hanging Grounds*, where there are *Springs*, into the *Lower Grounds*, carrying it in some long *Furrowes*; And from those *Furrowes*, drawing it traverse to spread the *water*. And this maketh an excellent Improvement, both for *Corne*, and *Grasse*. It is the richer, if those *Hanging Grounds* be fruitfull, because it washeth off some of the *Fatnesse* of the *Earth*: But howsoever it profiteth much. Generally, where there are great *Overflowses*, in *Fens*, or the like, the drowning of them in the *Winter*, maketh the *Summer* following more fruitfull: The *Cause* may be, for that it keepeth the *Ground* warme, and nourisheth it: But the *Fen-Men* hold, that the *Sewers* must be kept so, as the *water* may not stay too long in the *Spring*, till the *weeds* and *Sedge* bee growne up; For then the *Ground* will bee like a *Wood*, which keepeth out the *Sunne*; And so continueth the *Wet*; Whereby it will never graze (to purpose) that yeare. Thus much for *Irrigation*. But for *Avoidances*, and *Drawings* of *water*, where there is too much, and the *Helps* of *Ground* in that kinde, wee shall speake of them in another Place.

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P

NATV-

The Fifth Book of Exodus, is a second volume. It hath been an-
 tiquely divided into seven parts, and six, and six, with the voyage
 through the wilderness: whereof the first is the journey from
 Egypt to the wilderness; the second is the journey from the
 wilderness to the land of Canaan; the third is the journey from
 the land of Canaan to the land of Canaan; the fourth is the
 journey from the land of Canaan to the land of Canaan; the
 fifth is the journey from the land of Canaan to the land of
 Canaan; the sixth is the journey from the land of Canaan to
 the land of Canaan; the seventh is the journey from the land
 of Canaan to the land of Canaan; the eighth is the journey
 from the land of Canaan to the land of Canaan; the ninth is
 the journey from the land of Canaan to the land of Canaan;

[illegible]

that there is too much, and the Value of Ground in
that kind, we shall be able to
find out in another place.

УТАИ

5

NATVRALL HISTORIE.

VII. Century.



In the Differences betweene *Animate* and *Inanimate Bodies*, wee shall handle fully under the Title of *Life*, and *Living Spirits*, and *Powers*. Wee shall therefore make but a brieft Mention of them in this Place. The Main Differences are two. All *Bodies* have *Spirits*, and *Pneumaticall Parts* within them: But the Main Differences betweene *Animate* and *Inanimate*, are two: The first is, that the *Spirits* of *Things Animate*, are all Continued with themselves, and are Branched in *Veines*, and secret *Canales*, as *Bloud* is: And in *Living Creatures*, the *Spirits* have not only *Branches*, but certaine *Cells* or *Seats*, where the *Principall Spirits* doe reside, and whereunto the rest doe resort: But the *Spirits* in *Things Inanimate* are shut in, and cut off by the *Tangible Parts*; And are not peruous one to another; As *Aire* is in *Snow*. The second Main Difference is, that the *Spirits* of *Animate Bodies*, are all in some degree, (more or lesse,) kindled and inflamed; And have a fine Commixture of *Flame*, and an *Aëriall Substance*. But *Inanimate Bodies* have their *Spirits* no whit *Inflamed*, or *Kindled*. And this Difference consisteth not in the *Heat* or *Coolenesse* of *Spirits*; For *Cloves* and other *Spices*, *Naphtha* and *Petroleum*, have exceeding *Hot Spirits*, (hotter a great deale than *Oyle*, *Wax*, or *Tallow*, &c.) but not *Inflamed*. And when any of those *Weake* and *Temperate Bodies* come

Experiments
in Consort,
touching the
Affinities, and
Differences, be-
tweene *Plants*
and *Inanimate*
Bodies.

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to be Inflamed, then they gather a much greater Heat, than others have *Uninflamed*; besides their *Light*, and *Motion*, &c.

602

The *Differences*, which are *Secondary*, and proceed from these two *Radicall Differences*, are; First, *Plants* are all *Figurate* and *Determinate*, which *Inanimate Bodies* are not; For looke how farre the *Spirit* is able to Spread and Continue it selfe; So farre goeth the *Shape*, or *Figure*; And then is *determined*. Secondly, *Plants* doe nourish; *Inanimate Bodies* doe not: They have an *Accretion*, but no *Alimentation*. Thirdly, *Plants* have a *Period of Life*; which *Inanimate Bodies* have not. Fourthly, they have a *Succession*, and *propagation* of their *Kinde*; which is not in *Bodies Inanimate*.

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The *Differences* betweene *Plants*, and *Metalls* or *Fossiles*, besides those four before mentioned, (For *Metalls* I hold *Inanimate*), are these: First *Metalls* are more *Durable* than *Plants*: Secondly, they are more *Solid* and *Hard*: Thirdly, they are wholly *Subterrany*; Whereas *Plants* are part above *Earth*, and part under *Earth*.

604

There be very few *Creatures*, that participate of the *Nature* of *Plants*, and *Metalls* both; *Corall* is one of the Nearest of both *Kindes*: Another is *Vitrioll*, for that is aptest to sprout with *Moisture*.

605

Another speciall *Affinitie* is betweene *Plants* and *Mould* or *Putrefaction*: For all *Putrefaction* (if it dissolve not in *Arefaction*) will in the ende issue into *Plants*, or *Living Creatures* bred of *Putrefaction*. I account *Mosse*, and *Mushromes*, and *Agaricke*, and other of those kinds, to be but *Moulds* of the *Ground*, *Walls*, and *Trees*, and the like. As for *Flesh*, and *Fish*, and *Plants* themselves, and a Number of other things, after a *Moulding*, or *Rottenesse*, or *Corrupting*, they will fall to breed *Wormes*. These *Putrefactions*, which have *Affinitie* with *Plants*, have this *Difference* from them; That they have no *Succession* or *Propagation*, though they *Nourish*, and have a *Period of Life*, and have likewise some *Figure*.

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I left once, by chance, a *Citron* cut, in a close *Roome*, for three *Summer-moneths*, that I was absent; And at my *Returne*, there were grown forth, out of the *Pith* cut, *Tufts* of *Haires*, an *Inch* long, with little blacke *Heads*, as if they would have beene some *Herbe*.

Experiments
in Confort
touching the
Affinities, and
Differences, of
Plants, and *Li-
ving Creatures*:
And the *Consi-
derations* and *Parti-
cles* of them.

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THE *Affinities* and *Differences* betweene *Plants* and *Living Creatures*, are these that follow. They have both of them *Spirits Continued*, and *Branches*, and also *Inflamed*: But first in *Living Creatures*, the *Spirits* have a *Cell* or *Seat*, which *Plants* have not; As was also formerly said. And secondly, the *Spirits* of *Living Creatures* hold more of *Flame*, than the *Spirits* of *Plants* doe. And these two are the *Radicall Differences*. For the *Secondary Differences*, they are as follow. First, *Plants* are all *Fixed* to the *Earth*; Whereas all *Living Creatures* are severed, and of themselves. Secondly, *Living Creatures* have *Locall Motion*; *Plants* have not. Thirdly, *Living Creatures* nourish from their *Upper Parts*, by the *Mouth* chiefly; *Plants* nourish from below, namely from the *Roots*. Fourthly, *Plants* have their *Seed* and *Seminall Parts* uppermost; *Living Creatures* have

have them lower most : And therefore it was said, not elegantly alone, but Philosophically ; *Homo est Planta inversa* ; Man is like a Plant turned upwards : For the Root in Plants, is as the Head in Living Creatures. Fifthly, Living Creatures have a more exact Figure than Plants. Sixthly, Living Creatures have more Diversity of Organs within their Bodies, and (as it were) Inward Figures, than Plants have. Seventhly, Living Creatures have Sense, which Plants have not. Eighthly, Living Creatures have Voluntary Motion, which Plants have not.

For the Difference of Sexes in Plants, they are oftentimes by name distinguished ; As Male-Piony, Female-Piony ; Male-Rose-mary, Female-Rose-mary ; Hee-Holly, Shee-Holly ; &c. but Generation by Copulation (certainly) extendeth not to Plants. The nearest Approach of it, is between the Hee-Palme, and the Shee-Palme ; which, (as they report,) if they grow neare, incline the one to the other : In so much as, (that which is more strange,) they doubt not to report, that to keepe the Trees upright from Bending, they tye Ropes, or Lines, from the one to the other, that the Contact might be enjoyed by the Contact of a Middle Body. But this may be Faigned, or at least Amplified. Neverthelesse, I am apt enough to thinke, that this same Binariū of a Stronger and a Weaker, like unto Masculine and Feminine, doth hold in all Living Bodies. It is confounded sometimes ; As in some Creatures of Putrefaction, wherein no Markes of Distinction appeare : And it is doubled sometimes ; As in Hermaphrodites : But generally there is a Degree of Strength in most Species.

The Participles or Confiners betweene Plants and Living Creatures, are such chiefly, as are Fixed, and have no Locall Motion of Remove, though they have a Motion in the in Parts ; Such as are Oysters, Cockles, and such like. There is a Fabulous Narration, that in the Northerne Countries, there should be an Herbe that groweth in the likenesse of a Lambe, and feedeth upon the Grasse, in such sort as it will bare the Grasse round about. But I suppose, that the Figure maketh the Fable ; For so wee see, there bee Bee-Flowers, &c. And as for the Grasse, it seemeth the Plant, having a great Stalke and Top, doth prey upon the Grasse, a good way about, by drawing the Iuyce of the Earth from it.

The Indian Fig boweth his Roots downe so low, in one yeare, as of it selfe it taketh Root againe : And so multiplieth from Root to Root ; Making of one Tree a kinde of wood. The Cause is the Plenty of the Sap, and the Softnesse of the Stalke, which maketh the Bough, being overlodged, and not stiffely upheld, weigh downe. It hath Leaves, as broad as a little Target, but the Fruit no bigger than Beanes. The Cause is, for that the continuall Shade increaseth the Leaves, and abateth the Fruit ; which neverthelesse is of a pleasant Taste. And that (no doubt) is caused, by the Supplenesse and Gentlenesse of the Iuyce of that Plant, being that which maketh the Boughes also so Flexible.

It is reported by one of the Ancients, that there is a certaine Indian Tree,

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Experiments
Promiscuous
touching
Plants.

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Tree, having few, but very great, *Leaves*, three Cubits long, and two broad; And that the *Fruit*, being of good Taste, groweth out of the *Barke*. It may be, there be *Plants*, that poure out the *Sap* so fast, as they have no leisure, either to divide into many *Leaves*, or to put forth *Stalks* to the *Fruit*. With us *Trees* (generally) have small *Leaves*, in comparison. The *Fig* hath the greatest; And next it the *Vine*, *Mulberry*, and *Sycamore*; And the Least are those of the *Willow*, *Birch*, and *Thorne*. But there be found *Herbs* with farre greater *Leaves* than any *Tree*; As the *Burre*, *Gourd*, *Cucumber*, and *Cole-wort*. The Cause is, (like to that of the *Indian Fig*;) the hasty and plentifull Putting forth of the *Sap*.

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There bee three Things in use for Sweetnesse; *Sugar*, *Honey*, *Manna*. For *Sugar*, to the *Ancients* it was scarce knowne, and little used. It is found in *Canes*; *Quare*, whether to the first *Knuckle*, or further up? And whether the very *Barke* of the *Cane* it selfe do yeeld *Sugar*, or no? For *Honey*, the *Bee* maketh it, or gathereth it. But I have heard from one, that was industrious in Husbandry, that the labour of the *Bee* is about the *Wax*; And that bee hath knowne in the beginning of *May*, *Honey-Combs* empty of *Honey*; And within a fortnight, when the Sweet *Dewes* fall, filled like a *Cellar*. It is reported by some of the *Ancients*, that there is a *Tree* called *Occhus*, in the *Valleyes* of *Hyrcania*, that distilleth *Honey* in the *Mornings*. It is not unlike, that the *Sap* and *Teares* of some *Trees*, may be sweet. It may bee also, that some sweet *Juyces*, fit for many uses, may be concocted out of *Fruits*, to the Thickness of *Honey*, or perhaps of *Sugar*; The likeliest are *Rasins* of the *Sunne*, *Figs*, and *Corrants*: The *Meanes* may be enquired.

613

The *Ancients* report of a *Tree*, by the *Bersian Sea*, upon the *Shore-Sands*, which is nourished with the *Salt-water*; And when the *Tide* eb-beth, you shall see the *Roots*, as it were, bare without *Barke*, (being as it seemeth corroded by the *Salt*;) and grasping the *Sands* like a *Crab*; Which neverthelesse beareth a *Fruit*. It were good to try some *Hard Trees*, as a *Service-Tree*, or *Firre-Tree*, by setting them within the *Sands*.

614

There bee of *Plants*, which they use for *Garments*, these that follow. *Hempe*; *Flax*; *Cotton*; *Nettles*, (whereof they make *Nettle-Cloth*;) *Sericum*, which is a *Growing Silke*; They make also *Cables* of the *Barke* of *Lime-Trees*. It is the *Stalke* that maketh the *Filaceous Matter*, commonly; And sometimes the *Downe* that groweth above.

615

They have, in some *Countries*, a *Plant* of a *Rosy Colour*, which shutteth in the *Night*, Openeth in the *Morning*, and Openeth wide at *Noone*; which the *Inhabitants* of those *Countries* say is a *Plant* that sleepeeth. There bee *Sleepers* enow then; For almost all *Flowers* doe the like.

616

Some *Plants* there are, but rare, that have a *Mossy* or *Downy Root*; And likewise that have a *Number* of *Threds*, like *Beards*; As *Mandrakes*; whereof *Witches* and *Impossours* make an ugly *Image*, giving it the *Forme* of a *Face* at the *Top* of the *Root*, and leave those *Strings* to make a broad *Beard* downe to the *Foot*. Also there is a *Kinde* of *Nord*, in *Creet*, (being a *Kinde* of *Phu*) that hath a *Root* hairy, like a *Rough-Footed-Doves* foot.

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foot. So as you may see, there are of *Roots*, *Bulbous Roots*, *Fibrous Roots*, and *Hirsute Roots*. And, I take it, in the *Bulbous*, the Sap hasteneth most to the Aire, and Sunne: In the *Fibrous*, the Sap delighteth more in the Earth, and therefore putteth downward: And the *Hirsute* is a Middle betweene both; That besides the Putting forth upwards, and downwards, putteth forth in Round.

There are some *Teares of Trees*, which are kembered from the *Beards of Goats*: For when the *Goats* bite and crop them, especially in the Mornings, the Dew being on, the *Teare* commeth forth, and hangerh upon their *Beards*: Of this Sort is some kinde of *Ladanum*.

The *Irrigation* of the *Plaine-Tree* by *Wine*, is reported by the *Ancients*, to make it Fruitfull. It would bee tried likewise with *Roots*; For upon *Seeds* it worketh no great Effects.

The way to carry *Forraine Roots*, a long Way, is to vessell them close in *Earthen Vessells*. But if the *Vessells* be not very Great, you must make some Holes in the Bottome, to give some Refreshment to the *Roots*; Which otherwise (as it seemeth,) will decay, and suffocate.

The ancient *Cinnamon*, was, of all other *Plants*, while it grew, the Dryest; And those Things, which are knowne to comfort other *Plants*, did make that more Sterill: For in *Showers* it prospered worst: It grew also amongst *Bushes* of other kindes, where commonly *Plants* doe not thrive: Neither did it love the Sunne: There might bee one Cause of all those Effects; Namely, the sparing Nourishment, which that *Plant* required. *Quere* how farre *Cassia*, which is now the Substitute of *Cinnamon*, doth participate of these Things.

It is reported by one of the *Ancients*, that *Cassia*, when it is gathered, is put into the *Skins of Beasts*, newly fleyed; And that the *Skins* Corrupting, and Breeding *wormes*, the *Wormes* doe devoure the *Pith* and *Marrow* of it, and so make it Hollow; But meddle not with the *Barke*, because to them it is bitter.

There were, in Ancient Time, *Vines*, of farre greater *Bodies*, than wee know any; For there have beene *Cups* made of them, and an *Image of Iupiter*. But it is like they were *Wilde-Vines*; For the *Vines*, that they use for *wine*, are so often Cut, and so much Digged and Dressed, that their *Sap* spendeth into the *Grapes*, and so the *Stalke* cannot increase much in *Bulke*. The *Wood of Vines* is very durable, without *Rosting*. And that which is strange, though no *Tree* hath the *Twigges*, while they are Greene, so brittle, yet the *Wood* dryed is extreme Tough; And was used by the *Captaines of Armies*, amongst the *Romans*, for their *Cudgells*.

It is reported, that in some Places, *Vines* are suffered to grow like *Herbs*, spreading upon the *Ground*; And that the *Grapes* of those *Vines* are very great. It were good to make tryall, whether *Plants* that use to bee borne up by Props, will not put forth greater *Leaves*, and greater *Fruits*, if they be laid along the *Ground*; As *Hops*, *Ivy*, *wood-bine*, &c.

Quinces, or *Apples*, &c. if you will keepe them long, drowne them in *Honey*; But because *Honey* (perhaps) will give them a Taste Overluscious,

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lustrious, it were good to make Triall in Powder of Sugar; Or in Syrrup of Wine onely Boyled to Height. Both these would likewise be tried in Oranges, Limons, and Pomgranats; For the Powder of Sugar, and Syrrup of Wine, will serve for more times than once.

625 The Conservation of Fruit would be also tried in Vessells, filled with fine Sand, or with Powder of Chalke; Or in Meale and Flower; Or in Dust of Oake-wood; Or in Mill.

626 Such Fruits, as you appoint for Long Keeping, you must gather before they be full Ripe; And in a Faire and Dry Day, towards Noone; And when the Winde bloweth not South; And when the Moone is under the Earth; And in Decrease.

627 Take Grapes, and hang them in an Empty Vessell, well Stopped; And set the Vessell, not in a Cellar, but in some dry Place; And it is said, they will last long. But it is reported by some, they will keepe better, in a Vessell halfe full of Wine, so that the Grapes touch not the Wine.

628 It is reported, that the Preserving of the Stalke, helpeth to preserve the Grape; Especially if the Stalke be put into the Pith of Elder, the Elder not touching the Fruit.

629 It is reported by some of the Ancients, that Fruit put in Bottles, and the Bottles let downe into Wells under Water, will keepe long.

630 Of Herbs and Plants, some are good to eat Raw; As Lettuce, Endive, Purslane, Tarragon, Cresses, Cucumbers, Muske-Melons, Radish, &c. Others onely after they are Boyled, or have Passed the Fire; As Parsley, Clary, Sage, Parsnips, Turnips, Asparagus, Artichokes, (though they also being young are eaten Raw:) But a Number of Herbs are not Esculent at all; As Worme-Wood, Grasse, Greene-Corne, Centory, Hyssope, Lavender, Balme, &c. The Causes are, for that the Herbs, that are not Esculent, doe want the two Tastes, in which Nourishment resteth; Which are, Fat, and Sweet; And have (contrariwise) Bitter and Over-strong Tastes, or a Iuyce so Crude, as cannot be ripened to the degree of Nourishment. Herbes and Plants, that are Esculent Raw, have Fatnesse, or Sweetnesse, (as all Esculent Fruits;) Such are Onions, Lettuce, &c. But then it must be such a Fatnesse, (for as for Sweet Things, they are in effect alwayes Esculent,) as is not Over-grosse, and Loading of the Stomach; For Parsnips and Leeks have Fatnesse; But it is to Grosse and Heavy without Boyling. It must be also in a Substance somewhat Tender; For we see wheat, Barley, Artichokes, are no good Nourishment, till they have passed the Fire; But the Fire doth ripen, and maketh them soft and tender, and so they become Esculent. As for Radish, and Tarragon, and the like, they are for Condiments, and not for Nourishment. And even some of those Herbs, which are not Esculent, are notwithstanding Poculent; As Hop's, Broom, &c. Quere what Herbs are good for Drinke, besides the two aforenamed; For that it may (perhaps) ease the Charge of Brewing, if they make Beere to require lesse Malt, or make it last longer.

631 Parts fit for the Nourishment of Man, in Plants, are, Seeds, Roots, and Fruits; But chiefly Seeds, and Roots. For Leaves, they give no Nourishment;

ment, at a'l, or very little: No more doe *Flowers*, or *Blossomes*, or *Stalkes*. The Reason is, for that *Roots*, and *Seeds*, and *Fruits*, (in as much as all *Plants* consist of an *Oily* and *Watry* Substance commixed,) have more of the *Oily* Substance; And *Leaves*, *Flowers*, &c. of the *Watry*. And secondly, they are more *Concocted*; For the *Root*, which continueth ever in the *Earth*, is still *Concocted* by the *Earth*; And *Fruits*, and *Grains*, (we see) are halfe a yeare, or more, in *Concocting*; Whereas *Leaves* are out, and Perfect in a Moneth.

Plants (for the most part) are more strong, both in *Taste*, and *Smell*, in the *Seed*, than in the *Leafe*, and *Root*. The Cause is, for that in *Plants*, that are not of a Fierce and Eager Spirit, the Vertue is increased by *Concoction*, and *Mituration*, which is ever most in the *Seed*; But in *Plants*, that are of a Fierce and Eager Spirit, they are stronger whilst the Spirit is enclosed in the *Root*; And the *Spirits* doe but weaken, and dissipate, when they come to the *Aire*, and *Sunne*; As we see it in *Onions*, *Garlicke*, *Dragon*, &c. Nay there be *Plants*, that have their *Roots* very *Hot*, and *Aromaticall*; And their *Seeds* rather *Inspide*; As *Ginger*. The Cause is (as was touched before,) for that the *Heat* of those *Plants* is very *Dissipable*; which under the *Earth* is contained and held in; But when it commeth to the *Aire*, it exaleth.

The *Juyces* of *Fruits* are either *Watry*, or *Oily*. I reckon amongst the *Watry*, all the *Fruits* out of which *Drinke* is expressed; As the *Grape*, the *Apple*, the *Pear*, the *Cherry*, the *Pomgranate*, &c. And there are some others, which, though they be not in use for *Drinke*, yet they appeare to be of the same Nature; As *Plums*, *Services*, *Mulberries*, *Rasps*, *Orenges*, *Limons*, &c. And for those *Juyces*, that are so fleshy, as they cannot make *Drinke* by Expression, yet (perhaps) they may make *Drinke* by Mixture of *Water*;

Poculaq; admistis imitantur vitea Sorbis.

And it may bee *Heps* and *Brier-Berries* would doe the like. Those that have *Oily* *Juyce*, are; *Olives*, *Almonds*, *Nuts* of all sorts, *Pine-Apples*, &c. And their *Juyces* are all *Inflammable*. And you must observe also, that some of the *Watry* *Juyces*, after they have gathered *Spirit*, will Burne and Enflame; As *Wine*. There is a Third Kinde of *Fruit*, that is sweet, without either *Sharpnesse*, or *Oylineesse*: Such as is the *Fig*, and the *Date*.

It hath beene noted, that inost *Trees*, and specially those that beare *Mast*, are fruitfull but once in two yeares. The Cause (no doubt) is, the Expence of *Sap*; For many *Orchard-Trees*, well Cultured, will beare divers yeares together.

There is no *Tree*, which besides the *Naturall* *Fruit*, doth beare so many *Bastard-Fruits*, as the *Oake* doth: For besides the *Acorne*, it beareth *Galls*, *Oake-Apples*, and certaine *Oake-Nuts*, which are *Inflammable*; And certaine *Oake-Berries*, sticking close to the *Body* of the *Tree*, without *Stalke*. It beareth also *Misselroe*, though rarely. The Cause of all these may bee, the *Closenesse* and *Solidnesse* of the *Wood*, and *Pish* of the *Oake*; Which maketh severall *Juyces* finde severall *Eruptions*. And therefore,

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if you will devise to make any *Super-Plants*, you must ever give the *Sap* Plentifull Rising, and Hard Issue.

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There are two *Excrescences*, which grow upon *Trees*; Both of them in the Nature of *Mushromes*: The one the *Romans* called *Boletus*; Which groweth upon the *Roots* of *Oakes*; And was one of the *Dainties* of their *Table*; The other is *Medicinall*, that is called *Agaricke*, (whereof we have spoken before,) which groweth upon the *Tops* of *Oakes*; Though it be affirmed by some, that it groweth also at the *Roots*. I doe conceive, that many *Excrescences* of *Trees* grow chiefly, where the *Tree* is dead, or faded; For that the *Naturall Sap* of the *Tree*, corrupteth into some *Preternaturall Substance*.

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The greater Part of *Trees* beare *Most*, and *Best*, on the *Lower Boughs*; As *Oakes*, *Figs*, *Wall-Nuts*, *Peares*, &c. But some beare *Best* on the *Top-Boughs*; As *Crabs*, &c. Those that beare best below, are such, as *Shade* doth more good to, than *Hurt*. For generally all *Fruits* beare best lowest; Because the *Sap* tireth not, having but a short *Way*: And therefore in *Fruits* spred upon *Walls*, the *Lowest* are the *Greatest*, as was formerly said; So it is the *Shade* that hindereth the *Lower Boughs*; Except it bee in such *Trees*, as delight in *Shade*; Or at least beare it well. And therefore, they are either *Strong Trees*, as the *Oake*; Or else they have large *Leaves*, as the *Wallnut* and *Fig*; Or else they grow in *Pyramis*, as the *Pear*. But if they require very much *Sunne*, they beare best on the *Top*; As it is in *Crabs*, *Apples*, *Plums*, &c.

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There be *Trees*, that beare best, when they begin to be *Old*; As *Almonds*, *Peares*, *Vines*, and all *Trees* that give *Mast*. The *Cause* is, for that all *Trees*, that beare *Mast*, have an *Oily Fruit*; And *Young Trees* have a more *Watry Iuyce*, and lesse *Concocted*; And of the same kinde also is the *Almond*. The *Pear* likewise, though it be not *Oily*, yet it requireth much *Sap*, and well *Concocted*; For wee see it is a *Heavy Fruit*, and *Solide*; Much more than *Apples*, *Plums*, &c. As for the *Vine*, it is noted, that it beareth more *Grapes* when it is *Young*; But *Grapes* that make better *wine*, when it is *Old*; For that the *Iuyce* is better *Concocted*: And wee see that *wine* is *Inflammable*; So as it hath a kinde of *Oylineffe*. But the most Part of *Trees*, amongst which are *Apples*, *Plums*, &c. beare best when they are *Young*.

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There be *Plants*, that have a *Milke* in them, when they are *Cut*; As *Figs*, *Old Lettuce*, *Sow-Thistles*, *Spurge*, &c. The *Cause* may be an *Inception* of *Putrefaction*; For those *Milkes* have all an *Acrimony*; though one would thinke they should be *Lenitive*. For if you write upon *Paper*, with the *Milke* of the *Fig*, the *Letters* will not be seene, untill you hold the *Paper* before the *Fire*, and then they wax *Browne*; Which sheweth that it is a *Sharpe* or *Fretting Iuyce*: *Lettuce* is thought *Poysonous*, when it is so *Old*, as to have *Milke*; *Spurge* is a kinde of *Poyson* in it *Selfe*; And as for *Sow-Thistles*, though *Coneyes* eat them, yet *Sheepe* and *Cattell* will not touch them; And besides, the *Milke* of them, rubbed upon *Warts*, in short time, weareth them away: Which sheweth the *Milke* of

of them to be Corrosive. We see also, that *Wheat*, and other *Cornesowen*, if you take them forth of the *Ground*, before they sprout, are full of *Milke*; And the Beginning of *Germination* is ever a *Kinde* of *Putrefaction* of the *Seed*. *Euphorbium* also hath a *Milke*, though not very white, which is of a great *Acrimony*. And *Saladine* hath a yellow *Milke*, which hath likewise much *Acrimony*; For it cleanseth the *Eyes*. It is good also for *Cataracts*.

Mushromes are reported to grow, as well upon the *Bodies* of *Trees*, as upon their *Roots*, or upon the *Earth*: And especially upon the *Oake*. The *Cause* is, for that strong *Trees*, are towards such *Excrescences*, in the Nature of *Earth*; And therefore put forth *Mosse*, *Mushromes*, and the like.

There is hardly found a *Plant*, that yeeldeth a *Red Iuyce*, in the *Blade*, or *Eare*; Except it bee the *Tree* that beareth *Sanguis Draconis*: Which groweth (chiefly) in the *Island Soquatra*: The *Herb Amaranthus*, (indeed,) is *Red* all over; And *Brassill* is *Red* in the *wood*: And so is *Red Sanders*. That *Tree* of the *Sanguis Draconis*, groweth in the forme of a *Sugar-loose*. It is like, that the *Sap* of that *Plant*, concocteth in the *Body* of the *Tree*. For wee see that *Grapes*, and *Pomegranats*, are *Red* in the *Iuyce*, but are *Greene* in the *Teare*: And this maketh the *Tree* of *Sanguis Draconis*, lesser towards the *Top*; Because the *Iuyce* hasteneth not up; And besides it is very *Astringent*, And therefore of *Slow Motion*.

It is reported, that *Sweet Masse*, besides that upon the *Apple-Trees*, groweth likewise (sometimes) upon *Poplars*; And yet (generally) the *Poplar* is a *Smooth Tree* of *Bark*, and hath little *Mosse*. The *Mosse* of the *Larix Tree* burneth also sweet, and sparkleth in the *Burning*. *Quare* of the *Mosses* of *Odorate Trees*; As *Cedar*, *Cypres*, *Lignum Aloës*, &c.

The *Death* that is most without *Paine*, hath beene noted to be, upon the *Taking* of the *Potion* of *Hemlocke*; which in *Humanity* was the *Forme* of *Execution* of *Capitall Offenders* in *Athens*. The *Poyson* of the *Aspe*, that *Cleopatra* used, hath some affinity with it. The *Cause* is, for that the *Torments* of *Death* are chiefly raised by the *Strife* of the *Spirits*; And these *Vapours* quench the *Spirits* by *Degrees*; Like to the *Death* of an extreme *Old Man*. I conceive it is lesse *Painfull* than *Opium*, because *Opium* hath *Parts* of *Heat* mixed.

There be *Fruits*, that are *Sweet* before they be *Ripe*; As *Mirabolanes*; So *Fennell-Seeds* are *Sweet* before they ripen, and after grow *Spicy*. And some never *Ripen* to bee *Sweet*; As *Tamarinds*, *Barberries*, *Crabs*, *Slors*, &c. The *Cause* is, for that the former *Kinde* have much and subtile *Heat*, which causeth *Earely Sweetnesse*; The latter have a *Cold* and *Acide Iuyce*, which no *Heat* of the *Sunne* can sweeten. But as for the *Mirabolane*, it hath *Parts* of *Contrary Natures*; For it is *Sweet*, and yet *Astringent*.

There bee few *Herbes* that have a *Salt Taste*; And contrariwise all *Bloud* of *Living Creatures* hath a *Saltnesse*: The *Cause* may bee, for that *Salt*, though it bee the *Rudiment* of *Life*, yet in *Plants* the *Originall Taste* remaineth

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remaineth not; For you shall have them *Bitter, Sower, Sweet, Biting*, but seldome *Salt*: But in *Living Creatures*, all those *High Tastes* may happen to be (sometimes) in the *Humours*, but are seldome in the *Flesh*, or *Substance*; Because it is of a more *Ogly Nature*; which is not very *Susceptible* of those *Tastes*; And the *Saltnesse* it selfe of *Bloud*, is but a light, and secret *Saltnesse*: And even among *Plants*, some doe participate of *Saltnesse*, as *Alga Marina*, *Sampfire*, *Scorvy-Grasse*, &c. And they report, there is, in some of the *Indian Seas*, a *Swimming Plant*, which they call *Salgazzu*, spreading over the *Sea*, in such sort, as one would thinke it were a *Meadow*. It is certaine, that out of the *Asbes* of all *Plants*, they extract a *Salt*, which they use in *Medicines*.

It is reported by one of the *Ancients*, that there is an *Herb* growing in the *Water*, called *Lincastra*, which is full of *Prickles*: This *Herb* putteth forth another small *Herb* out of the *Leafe*; which is imputed to some *Mistake*, that is gathered betweene the *Prickles*, which *Putrified* by the *Sunne*, *Germinateth*. But I remember also I have seene, for a great *Rarity*, one *Rose* grow out of another, like *Honey-Suckles*, that they call *Top* and *Top-gallants*.

Barley, (as appeareth in the *Malting*,) being steeped in *water* three dayes, and afterwards the *Water* drained from it, and the *Barley* turned upon a dry floare, will sprout, halfe an *Inch* long at least: And if it bee let alone, and not turned, much more; untill the *Heart* bee out. *Wheat* will doe the same. Try it also with *Pease*, and *Beanes*. This *Experiment* is not like that of the *Orpin*, and *Semper-Vive*; For there it is of the old *Store*, for no *Water* is added; But here it is nourished from the *water*. The *Experiment* would bee further driven: For it appeareth already, by that which hath beene said, that *Earth* is not necessary to the first *Sprouting* of *Plants*; And wee see that *Rose-Buds* set in *water*, will *Blow*: Therefore try whether the *Sprouts* of such *Graines* may not be raised to a further *Degree*; As to an *Herb*, or *Flower*, with *Water* onely; Or some small commixture, of *Earth*: For if they will, it should seeme by the *Experiments* before, both of the *Malt*, and of the *Roses*, that they will come far faster on in *Water*, than in *Earth*: For the *Nourishment* is easilier drawne out of *Water*, than out of *Earth*. It may give some light also, that *Drinke* infused with *Flesh*, as that with the *Capon*, &c. will nourish faster and easilier, than *Meat* and *Drinke* together. Try the same *Experiment* with *Roots*, as well as with *Graines*: as for Example, take a *Turnip*, and steepe it a while, and then dry it, and see whether it will sprout.

Malt in the *Drenching* will swell: And that in such a manner, as after the *Putting forth* in *Sprouts*, and the *drying* upon the *Keele*, there will be gained at least a *Bushell* in eight, and yet the *Sprouts* are rubbed off; And there will be a *Bushell* of *Dust* besides the *Malt*: Which I suppose to be, not onely by the loose, and open *Laying* of the *Parts*, but by some *Addition* of *Substance*, drawne from the *Water*, in which it was steeped.

Malt gathereth a *Sweetnesse* to the *Taste*, which appeareth yet more in

in the Wort. The *Dulcoration* of Things is worthy to be tried to the full; For that *Dulcoration* importeth a degree to *Nourishment*: And the Making of Things *Inalimentall*, to become *Alimentall*, may be an Experiment of great Profit, for Making new *Vitall*.

Most *Seeds* in the Growing, leave their *Huske* or *Rinde* about the *Root*; But the *Onion* will carry it vp, that it will be like a Cap vpon the Top of the *Young Onion*. The Cause may be, for that the *Skin* or *Huske* is not easie to breake; As we see by the Pilling of *Onions*, what a Holding substance the *Skin* is.

Plants, that have *Curled Leaves*, doe all abound with *Moysture*; Which commeth so fast on, as they cannot spread themselves *Plaine*, but must needs gather together. The Weakest Kinde of *Curling* is *Roughnesse*; As in *Clary*, and *Burre*. The Second is *Curling* on the Sides; As in *Lettuce*, and *Young Cabbage*: And the Third is *Folding* into an *Head*; As in *Cabbage* full growne, and *Cabbage-Lettuce*.

It is reported, that *Jirre*, and *Pine*, especially if they be *Old* and *Petrified*, though they shine not, as some *Rotten Woods* doe, yet in the sudden *Breaking* they will sparkle like *Hard Sugar*.

The *Roots* of *Trees* doe, (some of them,) put downwards deepe into the *Ground*; As the *Oake*, *Pine*, *Firre*, &c. Some spread more towards the *Surface* of the *Earth*; As the *Ash*, *Cypresse-Tree*, *Olive*, &c. The Cause of this latter may be, for that such *Trees* as love the *sunne*, doe not willingly descend farre into the *Earth*; And therefore they are (commonly) *Trees*, that shoot vp much; For in their *Body*, their desire of Approach to the *sunne*, maketh them spread the lesse. And the same Reason, under *Ground*, to avoid *Recesse* from the *sunne*, maketh them spread the more. And wee see it commeth to passe in some *Trees*, which have beene planted too deep in the *Ground*, that for love of Approach to the *sunne*, they forsake their first *Root*, and put out another more towards the *Top* of the *Earth*. And we see also, that the *Olive* is full of *Oylie Tugor*; And *Ash* maketh the best *Fire*; And *Cypresse* is an *Hot Tree*. As for the *Oake*, which is of the former sort, it loveth the *Earth*; And therefore groweth slowly. And for the *Pine*, and *Firre* likewise; they have so much *Heat* in themselves, as they need lesse the *Heat* of the *sunne*. There be *Herbs* also, that have the same difference; As the *Herb* they call *Morsus Diaboli*; which putteth the *Root* downe so low, as you cannot pull it up without *Breaking*; Which gave Occasion to the *Name*, and *Fable*; For that it was said, it was so wholesome a *Root*, that the *Devill*, when it was gathered, bit it for *Envy*; And some of the *Ancients* doe report, that there was a Goodly *Firre*, (which they desired to remove whole,) that had a *Root* under *Ground* eight Cubits deepe; And so the *Root* came up broken.

It hath beene observed, that a *Branch* of a *Tree*, being *Unbarked* some space at the *Bottom*, and so set into the *Ground*, hath growen; even of such *Trees*, as if the *Branch* were set with the *Bark* on, they would not grow; yet contrariwise we see, that a *Tree* *Pared round* in the *Body*, above

Ground, will die. The Cause may be, for that the *Vnbarkt Part* draweth the Nourishment best, but the *Barke* continueth it only.

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Grapes will continue *Fresh*, and *Moist*, all Winter long, if you hang them, *Cluster by Cluster*, in the *Roofe* of a *Warne Rcome*; Especially, if when you gather the *Cluster*, you take off with the *Cluster* some of the *Stocke*.

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The *Reed* or *Cane* is a *Watry Plant*, and groweth not but in the *Water*; It hath these Properties; That it is *Hollow*; That it is *Knuckled* both *Stalke*, and *Root*; That being *Drie*, it is more *Hard* and *Fragile*, than other *Wood*, That it putteth forth no *Boughs*, though many *Stalks* come out of one *Root*. It differeth much in greatnesse; The smallest being fit for *Thatching* of *Houses*; And *Stopping* the *Chinckes* of *Ships*; Better than *Glew*, or *Pitch*. The Second Bignesse, is used for *Angle Rods*, and *Staves*; And in *China* for beating of *Offenders* upon the *Thighs*. The differing *Kinds* of them are; The *Common Reed*; The *Cassia Fistula*; And the *Sugar Reed*. Of all *Plants*, it boweth the easiest, and riseth againe. It seemeth, that amongst *Plants*, which are nourished with *Mixture* of *Earth* and *Water*, it draweth most Nourishment from *Water*; which maketh it the *Smoother* of all others in *Barke*; And the *Hollowest* in *Body*.

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The *Sap* of *Trees*, when they are let *Bloud*, is of differing *Natures*. Some more *Watry* and *Cleare*; As that of *Vines*; of *Beeches*; of *Pears*. Some *Thicke*; As *Apples*. Some *Gummy*; as *Cherries*. Some *Frothy*, ie, As *Elmes*. Some *Milkie*; As *Figs*. In *Mulberries*, the *Sap* seemeth to be (almost) towards the *Barke* only; For if you cut the *Tree* a little into the *Barke*, with a *Stone*, it will come forth; If you pierce it deeper with a *Tool*, it will be drie. The *Trees*, which have the *Moistest Juices* in their *Fruit*, have commonly the *Moistest Sap* in their *Body*; For the *Vines* and *Pears* are very *Moist*; *Apples* somewhat more *Spongie*. The *Milke* of the *Figge* hath the *Qualitie* of the *Rennet*, to gather *Cheese*; And so have certaine *Soure Herbs* wherewith they make *Cheese* in *Lent*.

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The *Timber* and *Wood* are, in some *Trees*, more *Cleane*, in some more *Knottie*; And it is a good *Triall*, to trie it by *Speaking* at one *End*, and *Laying* the *Eare* at the *Other*; For if it be *Knottie*, the *Voice* will not passe well. Some have the *Veins* more varied and chamloted; As *Oake*, whereof *Wainscot* is made; *Maple*, whereof *Trenchers* are made: Some more smooth, as *Firre*, and *Walnut*: Some doe more easily breed *Wormes* and *Spiders*; Some more hardly, as it is said of *Irish Trees*; Besides there bee a Number of Differences that concerne their *Vse*; As *Oake*, *Cedar*, and *Chestnut*, are the best *Builders*: Some are best for *Plough-Timber*; As *Asb*; Some for *Peeres*, that are sometimes wet, and sometimes drie; As *Elme*: Some for *Planchers*; As *Deale*: Some for *Tables*, *Cupboards*, and *Desks*; As *Walnuts*: Some for *Ship-Timber*; As *Oakes* that grow in *Moist Grounds*; For that maketh the *Timber* *Tough*, and not apt to rift with *Ordinance*; Wherein *English* and *Irish Timber* are thought to excell: Some for *Masts* of *Ships*; As *Firre*, and *Pine*, because of their Length,

Length, Straightnesse, and Lightnesse: Some for *Pale*; As *Oake*: Some for *Euell*; As *Ash*: And so of the rest.

The *Comming of Trees* and *Plants* in certaine *Regions*, and not in others, is sometimes *Casuall*: For many have beene translated, and have prospered well; As *Damask-Roses*, that have not beene knowne in *England* above an hundred yeares, and now are so common. But the liking of *Plants* in certaine *Soiles*, more than in others, is meere *Naturall*; As the *Firre* and *Pine* love the *Mountaines*; The *Poplar*, *Willow*, *Sallow*, and *Alder*, love *Rivers*, and *Moist Places*: The *Ash* loveth *Coppices*; But is best in *Standards* alone: *Juniper* loveth *Chalkes*; And so doe most *Fruit-Trees*: *Sampire* groweth but upon *Rocks*: *Reeds* and *Ofers* grow where they are washed with *Watine*: The *Vine* loveth *Sides of Hills*, turning upon the *South-East-Sunne*, &c.

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The *Putting forth* of certaine *Herbs* discovereth of what *Nature* the *Ground* where they put forth, is: As *Wilde Thyme* sheweth good *Feeding Ground* for *Cattle*: *Betony* and *Strawberries* shew *Grounds* fit for *Wood*: *Camomill* sheweth *Mellow Grounds* fit for *Wheat*: *Mustard-Seed*, growing after the *Plough*, sheweth a good *Strong Ground* also for *Wheat*: *Barnet* sheweth good *Meadow*: And the like.

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There are found, in divers *Countries*, some other *Plants*, that grow out of *Trees*, and *Plants*, besides *Mistletoe*: As in *Syria*, there is an *Herb* called *Cassia*, that groweth out of tall *Trees*, and windeth it selfe about the same *Tree* where it groweth; And sometimes about *Thornes*. There is a kinde of *Polypode*, that groweth out of *Trees*, though it windeth not. So likewise an *Herbe* called *Ramus*, upon the *Wilde Olive*. And an *Herbe* called *Hippophaeton* upon the *Fullers Thorne*; Which, they say, is good for the *Falling-Sicknesses*.

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It hath beene observed, by some of the *Ancients*, that howsoever *Cold* and *Easterly Winds*, are thought to be great *Enemies* to *Fruit*; yet nevertheless *South-Winds* are also found to doe *Hurt*; Especially in the *Blossoming* time; And the more, if *Showers* follow. It seemeth, they call forth the *Moisture* too fast. The *West winds* are the best. It hath beene observed also that *Greene* and *Open Winters* doe hurt *Trees*; Inasmuch as if two or three such *Winters* come together, *Almond-Trees*, and some other *Trees*, will dye. The *Cause* is the same with the former, because the *Lust* of the *Earth* overspendeth it selfe; Howsoever some other of the *Ancients* have commended *Warne Winters*.

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Snowes, lying long, cause a *Fruitfull Yeare*, For first, they keepe in the *Strength* of the *Earth*; Secondly, they water the *Earth*, better than *Raine*; For in *Snow*, the *Earth* doth (as it were) sucke the *Water*, as out of the *Teat*. Thirdly, the *Moisture* of *Snow* is the finest *Moisture*; For it is the *Froth* of the *Cloudy Waters*.

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Showers, if they come a little before the *Ripening* of *Fruits*, doe good to all *Succulent* and *Moist Fruits*; As *Vines*, *Olives*, *Pomegranates*; Yet it is rather for *Plenty*, than for *Goodnesse*; For the best *Wines* are in the *Driest Vintager*: *Small Showers* are likewise good for *Corne*, so as

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Parching Heats come not upon them. Generally, *Night-Showers* are better than *Day-Showers*; For that the *sunne* followeth not so fast upon them: and we see, even in *Watring* by the *Hand*, it is best, in *summer* time, to water in the *Evening*.

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The *Differences* of *Earths*; and the *Triall* of them, are worthy to be diligently inquired. The *Earth*, that with *showers* doth easiliest *soften*, is commended; And yet some *Earth* of that kinde will be very *Dry*, and *Hard* before the *showers*. The *Earth* that casteth up from the *Plough*, a great *Clod*, is not so good, as that, which casteth up a *Smaller Clod*. The *Earth*, that putteth forth *Mosse* easily, and may bee called *Mouldie*, is not good. The *Earth*, that smelleth well upon the *Digging*, or *Ploughing*, is commended; As containing the *Juyce* of *Vegetables* almost already prepared. It is thought by some, that the *Ends* of low *Raine-bowes*, fall more upon one kinde of *Earth* than upon another: As it may well bee; For that that *Earth* is most *Roside*: And therefore it is commended for a *Signe* of good *Earth*. The *Poorenesse* of the *Herbs*, (it is plaine,) shew the *Poorenesse* of the *Earth*; And especially if they be in *Colours* more darke: But if the *Herbs* shew *Withered*, or *Blasted* at the *Top*, it sheweth the *Earth* to be very *Cold*: And so doth the *Mossinesse* of *Trees*. The *Earth*, whereof the *Grasse* is soone *Parched* with the *Sun*, and *Toasted*, is commonly *Forced Earth*, and *Barren* in his owne *Nature*. The *Tender*, *Cheffome*, and *Mellow Earth*, is the best; Being meere *Mould*, betweene the two *Extreames* of *Clay*, and *Sand*; Especially if it be not *Leamy*, and *Binding*. The *Earth*, that after *Raine*, will scarce be *Ploughed*, is commonly *Fruitfull*; For it is *Gleaving*, and full of *Jayce*.

666

It is strange, which is observed by some of the *Ancients*, that *Dust* helpeth the *Fruitfulnessse* of *Trees*; and of *Vines*, by name: Inso much as they cast *Dust* upon them of purpose. It should seeme, that that *Powdring*, when a *Shower* cometh, maketh a kinde of *Soyling* to the *Tree*, being *Earth* and *water*, finely layd on. And they note, that *Countries*, where the *Fields* and *Wages* are *Dusty*, beare the best *Vines*.

667

It is commended by the *Ancients*, for an *Excellent Helpe* to *Trees*, to lay the *Stalkes* and *Leaves* of *Lupines* about the *Roots*; Or to *Plough* them into the *Ground*, where you will sow *Corne*. The *Burning* also of the *Cuttings* of *Vines*, and *Casting* them upon *land*, doth much *Good*. And it was generally received of old, that *Dunging* of *Grounds*, when the *West Wind* bloweth, and in the *Decrease* of the *Moone*, doth greatly helpe; The *Earth* (as it seemeth) being then more *thirsty*, and open, to receive the *Dung*.

668

The *Grafting* of *Vines* upon *Vines*, (as I take it,) is not now in use: The *Ancients* had it, and that three wayes: The first was *Insition*, which is the *Ordinary* manner of *Grafting*: The *Second* was *Terebration*, through the *Middle* of the *stocke*, and putting in the *Cions* there: And the *Third* was *Paring* of two *Vines*, that grow together, to the *Marrow*, and *Binding* them close.

669

The *Diseases* and ill *Accidents* of *Corne*, are worthy to be enquired; And

And would be more worthy to be enquired, if it were in Mens Power to help them; Whereas many of them are not to be remedied. The *Mill-dew* is one of the Greatest; which (out of question) commeth by *Clofenesse of Aire*; And therefore in *Hills*, or large *Champaigne Grounds*, it seldome commeth; Such as is with us *York's Wold*. This cannot be remedied, otherwise than that in *Countrie*s of Small Enclosure, the *Grounds* be turned into larger *Fields*: Which I have knowne to doe good in some *Farmes*. Another *Disease* is the *Putting forth of Wilde Oats*, whereinto *Corne* oftentimes, (especially *Barley*), doth degenerate. It happeneth chiefly from the *Weaknesse* of the *Graine* that is sown; For if it be either too Old, or Mouldy, it will bring forth *Wilde Oats*. Another *Disease* is the *Sacietie* of the *Ground*; For if you sow one *Ground* still with the same *Corne*, (I meane not the same *Corne* that grew upon the same *Ground*;) but the same *Kinde* of *Graine*; (As *Wheat*, *Barley*, &c. it will prosper but poorely: Therefore besides the *Resting* of the *Ground*, you must varie the *Seed*. Another ill *Accident* is, from the *winds*, which hurt at two times; At the *Flowring*, by *Shaking off* the *Flowers*; And at the full *Ripening*, by *Shaking out* the *Corne*. Another ill *Accident* is, *Drowth*, at the *Spindling* of the *Corne*; Which with us is rare; But in *Hotter Countrie*s, common: Insomuch as the Word, *Calamitas*, was first derived from *Calamus*, when the *Corne* could not get out of the *Stalke*. Another ill *Accident* is, *Over-wet* at *Sowing-Time*; which with us breedeth much *Dearth*; Insomuch as the *Corne* never commeth up; And (many times) they are forced to resow *Sommer-Corne*, where they sowed *Winter-Corne*. Another ill *Accident* is *Bitter Frosts*, continued, without *snow*; Especially in the Beginning of the *Winter*, after the *Seed* is new Sown. Another *Disease* is *Wormes*; which sometimes breed in the *Root*, and happen upon *Hot Sunnes*, and *Showers*, immediately after the *Sowing*; And another *Worme* breedeth in the *Eare* it Selfe; Especially when *Hot Sunnes* breake often out of *Clouds*. Another *Disease* is *Weeds*; And they are such, as either *Choake*, and *Over-shadow* the *Corne*, and beare it downe; Or *starve* the *Corne*, and deceive it of *Nourishment*. Another *Disease* is, *Over-Ranchnesse* of the *Corne*; Whch they use to remedy, by *Mowing* it after it is come up; Or putting *Sheepe* into it. Another ill *Accident* is *Laying* of *Corne* with great *Raines*, neare, or in *Harvest*. Another ill *Accident* is, if the *Seed* happen to have touched *Oyle*, or any *Thing*, that is *Fat*; For those *Substances* have an *Antipathy* with *Nourishment* of *Water*.

The *Remedies* of the *Diseases* of *Corne* have beene observed as followeth. The *Steeping* of the *Graine*, before *Sowing*, a little time in *Wine*, is thought a *Preservative*: The *Mingling* of *Seed-Corne* with *Asbes*, is thought to be good: The *Sowing* at the *wane* of the *Moone*, is thought to make the *Corne* sound: It hath not beene practised, but it is thought to be of use, to make some *Miscellane* in *Corne*; As if you sow a few *Beanes* with *Wheat*, your *Wheat* will be the better. It hath been observed, that the *Sowing* of *Corne* with *Houfleeke*, doth good. Though *Graine*, that

toucheth Oyle, or Fat, receiveth hurt, yet the Steeping of it, in the Dregs of Oyle, when it beginneth to Putrifie, (which they call *Amurca*,) is thought to assure it against *Wormes*. It is reported also, that if *Corne* be Mowed, it will make the *Graine* Longer, but Emptier, and having More of the *Hauke*.

671

It hath beene noted, that *Seed* of a yeare old, is the Best; And of two or three yeares is worse; And that which is more Old, is quite Barren; Though (no doubt) some *Seeds* and *Graines* last better than others. The *Corne*, which in the *Vanning* lieth lowest, is the best; And the *Corne*, which broken or bitten retaineth a little *Yellownesse*, is better than that which is very *White*.

672

It hath beene observed, that of all *Roots* of *Herbs*, the *Root* of *Sorrell* goeth the furthest into the *Earth*; Inasmuch as it hath bin knowne to go three *Cubits* deepe; And that it is the *Root* that continueth fit (longest) to be set againe, of any *Root* that groweth. It is a *Cold* and *Acide* *Herb*, that (as it seemeth) loveth the *Earth*, and is not much drawne by the *Sunne*.

673

It hath beene observed, that some *Herbs* like best, being warred with *Salt-Water*; And *Radish*, *Beet*, *Rew*, *Pennyroyall*; This Triall would be extended to some other *Herbs*; Especially such as are Strong; As *Tarragon*, *Mustard-Seed*, *Rocket*, and the like.

674

It is strange that is generally received, how some *Paysonous Beasts* affect *Odorate* and *Wholsome Herbs*; As that the *Snake* loveth *Fennell*; That the *Toad* will be much under *Sage*; That *Frogs* will be in *Cinquefoile*. It may be, it is rather the *Shade*, or other *Coverture*, that they take liking in, than the *Virtue* of the *Herb*.

675

It were a Matter of great Profit, (save that I doubt it is too Conjecturall to venture upon,) if one could discerne, what *Corne*, *Herbs*, or *Fruits*, are like to be in *Plenty*, or *Scarcity*, by some *Signes* and *Prognosticks*, in the Beginning of the *Yeare*: For as for those, that are like to be in *Plenty*, they may be bargained for, upon the *Ground*; As the Old Relation was of *Thales*; who to shew how easie it was for a *Philosopher* to be rich, when he fore-saw a great *Plenty* of *Olives*, made a *Monopoly* of them. And for *Scarcity*, Men may make Profit in keeping better the Old Store. Long Continuance of *Snow* is beleev'd to make a *Fruitfull Yeare* of *Corne*: An *Early Winter*, or a very *Late Winter*, a *Barren Yeare* of *Corne*: An *Open* and *Serene Winter*, an ill *Yeare* of *Fruit*: These we have partly touched before: But other *Prognosticks* of like Nature are diligently to be enquired.

676

There seeme to be, in some *Plants*, *Singularities*, wherein they differ from al Other; The *Olive* hath the *Oyle* Part, only on the *Outside*; Whereas all other *Fruits* have it in the *Nut*, or *Kernell*. The *Firre* hath (in effect) no *Stone*, *Nut*, nor *Kernell*; Except you will count the little *Graines* *Kernells*. The *Pomegranate* and *Pine-Apple* have onely, amongst *Fruits*, *Graines* distinct in severall *Cells*. No *Herbs* have *Curled Leaves*, but *Cabbage*, and *Cabbage-Lettuce*. None have double *Leaves*, one belong to the

the *Stalke*, another to the *Fruit* or *Seed*, but the *Artichoke*: No *Flower* hath that kinde of *Spread* that the *Woodbine* hath. This may be a large *Field* of *Con:emplation*; For it sheweth that in the *Frame* of *Nature*, there is, in the *Producing* of some *Species*, a *Composition* of *Matter*, which happeneth oft, and may be much diversified: In others, such as happeneth rarely, and admitteth little *Variety*: For so it is likewise in *Beasts*: *Dogs* have a *Resemblance* with *Wolves*, and *Foxes*; *Horses* with *Asses*; *Kine* with *Buffes*; *Hares* with *Coneyes*; &c. And so in *Birds*: *Kites* and *Kestrells* have a *Resemblance* with *Hawkes*; *Common-Doves* with *Ring-Doves*, and *Turtles*; *Black-Birds* with *Thrushes*, and *Mavisses*; *Crowes* with *Ravens*, *Dawes*, and *Choughes*, &c. But *Elephants*, and *Swine* amongst *Beasts*; And the *Bird of Paradise*, and the *Peacocke* amongst *Birds*; And some few others; have scarce any other *Species*, that have *Affinity* with them.

We leave the *Discription* of *Plants*, and their *Vertues*, to *Herballs*, and other like *Bookes* of *Naturall History*: Wherein *Mens Diligence* hath beene great, even to *Curiosity*: For our *Experiments* are only such, as doe ever ascend a *Degree* to the *Deriving* of *Causes*, and *Extracting* of *Axiomes*, which, wee are not ignorant, but that some, both of the *Ancient*, and *Moderne Writers*, have also laboured; But their *Causes*, and *Axiomes*, are so full of *Ignagination*, and so infected with the old *Received Theories*, as they are meere *Inquinations* of *Experience*, and *Concoct* it not.

IT hath beene observed, by some of the *Ancients*, that *Skins*, (especially of *Rames*,) newly pulled off, and applied to the *Wounds* of *Stripes*, doe keepe them from *Swelling*, and *Exulcerating*; And likewise Heale them, and Close them up; And that the *Whites* of *Eggs* doe the same. The *Cause* is a *Temperate Conglutination*; For both *Bodies* are *Clammy*, and *Viscous*, and doe bridle the *Deflux* of *Humours* to the *Hurts*, without *Penning* them in too much.

YOU may turne (almost) all *Flesh* into a *Fatty Substance*, if you take *Flesh*, and cut it into *Pieces*, & put the *Pieces* into a *Glasse* covered with *Parchment*; And so let the *Glasse* stand six or seven *Houres* in *Boyl:ing Water*. It may be an *Experiment* of *Profit*, for *Making* of *Fat*, or *Grease*, for many uses; But then it must be of such *Flesh* as is not *Edible*; As *Horses*, *Dogs*, *Beares*, *Foxes*, *Badgers*, &c.

Experiment
Solitary, touch-
ing Healing
of Wounds.

677

Experiment
Solitary, touch-
ing Fat dif-
fused in Glass.

678

It

Experiment
Solitary, touch-
ing Ripening
of Drinke be-
gins Time.

679

Experiment
Solitary, touch-
ing Pilosity
and Plumage.

680

IT is reported by one of the *Ancients*, that *New Wine*, put into *Ves-*
self well stopped, and the *Vessels* let down into the *Sea*, will accelerate
very much; the Making of them *Ripe*, and *Potable*. The same would be
tried in *Wort*.

BEASTS are more *Hairy* than *Men*; And *Savage Men* more than *Civill*;
And the *Plumage* of *Birds* exceedeth the *Pilosity* of *Beasts*. The *Cause*
of the *Smoothnesse* in *Men*, is not any *Abundance* of *Heat*, and *Moisture*,
though that indeed causeth *Pilosity*; But there is requisite to *Pilosity*, not
so much *Heat* and *Moisture* as *Excrementitious Heat* and *Moisture*: (For
whatsoever assimilath, goeth not into the *Haire*;) And *Excrementi-*
tious Moisture aboundeth most in *Beasts*, and *Men* that are more *Savage*.
Much the same Reason is there of the *Plumage* of *Birds*; For *Birds* alli-
milate lesse, and exerne more than *Beasts*: For their *Excrements* are
ever liquid, and their *Flesh* (generally) more dry: Beside, they have
not *Instruments* for *Vrine*; And so all the *Excrementitious Moisture* goeth
into the *Feathers*: And therefore it is no *Marvell*, though *Birds* bee
commonly better *Meat* than *Beasts*, because their *Flesh* doth assimilate
more finely, and secerneth more subtilly. Againe, the *Head* of *Man* hath
Haire upon the *first Birth*, which no other *Part* of the *Body* hath. The
Cause may bee *want* of *Perspiration*: For Much of the *Matter* of *Haire*, in
the other *Parts* of the *Body*, goeth forth by *Insensible Perspiration*; And
besides, the *Skull* being of a more solide Substance, nourisheth and as-
similath lesse, and exerneth more: And so likewise doth the *Chinne*;
We see also that *Haire* commeth not upon the *Palms* of the *Hands*, nor
Soles of the *Feet*; Which are *Parts* more *Perspirable*. And *Children*
likewise are not *Hairy*, for that their *Skins* are more *Perspirable*.

Experiment
Solitary, touch-
ing the
Quicknesse of
Motion in
Birds.

681

Experiment
Solitary, touch-
ing the dif-
ferent Cleare-
nesse of the *Sea*.

682

Experiment
Solitary, touch-
ing the dif-
ferent Heats of
Fire and *Boyl-*
ing Water.

683

BIRDS are of *Swifter Motion* than *Beasts*: For the *Flight* of many *Birds*
is *Swifter*, than the *Race* of any *Beasts*. The *Cause* is, for that the *Spirits*
in *Birds*, are in greater *Proportion*, in comparison of the *Bulke* of their
Body, than in *Beasts*: For as for the Reason that some give, that they
are partly *Carried*, whereas *Beasts* goe, that is *Nothing*; For by that
Reason *Swimming* should be *swifter*, than *Running*: And that *Kinde*
of *Carriage* also, is not without *Labour* of the *Wing*.

THE *Sea* is *Clearer*, when the *North-Wind* bloweth, than when the
South-Wind. The *Cause* is, for that *Salt-Water* hath a little *Oyline*
in the *Surface* thereof; As appeareth in verie *Hot Dayes*: And againe,
for that the *Southerne Wind* relaxeth the *Water* somewhat; As no *Water*
Boyling is so *Clear* as *Cold Water*.

FIRE burneth *Wood*, making it first *Luminous*; Then *Black* and *Brittle*;
And lastly, *Broken* & *Incinerate*: *Scalding Water* doth none of these.
The *Cause* is, for that by *Fire*, the *Spirit* of the *Body* is first *Refined*, and
then *Emitted*; Whereof the *Refining*, or *Attenuation* causeth the *Light*;
And

And the *Emission*, first the *Fragilitie*, and after the *Dissolution* into *Asbes*: Neither doth any other *Body* enter: But in *Water* the *Spirit* of the *Body* is not *Refined* so much; And besides *Part* of the *Water* entreth; Which doth increase the *Spirit*, and in a degree extinguish it: Therefore we see that *Hot Water* will quench *Fire*. And againe we see, that in *Bodies*, wherein the *Water* doth not much enter, but only the *Heat* passeth, *Hot Water* worketh the Effects of *Fire*: As in *Egges Boyled*, and *Roasted*; (into which the *Water* entreth not at all;) there is scarce difference to be discerned; But in *Fruit*, and *Flesh*, whereinto the *Water* entreth, in some *Part*, there is much more difference.

THe *Bottom* of a *Vessel* of *Boiling Water*, (as hath bin observed,) is not very much *Heated*, So as Men may put their *Hand* under the *Vessel*, and remove it. The *Cause* is, for that the *Moisture* of *Water*, as it quen- cheth *Coales*, where it entreth; So it doth allay *Heat*, where it toucheth: And therefore note well, that *Moisture*, although it doth not passe thro- row *Bodies*, without *Communication* of some *Substance*, (As *Heat* and *Gold* doe;) yet it worketh manifest Effects; not by Entrance of the *Bo- dy*, but by Qualifying of the *Heat*, and *Cold*; As wee see in this *In- stance*: And we see likewise, that the *Water* of *Things distilled in Water*, (which they call the *Bath*,) differeth not much from the *Water* of *Things Distilled by Fire*: Wee see also, that *Pewter-Dishes*, with *Water* in them, will not Melt easily; But without it, they will: Nay we see more, that *Butter*, or *Oile*, which in themselves are *Inflammable*, yet by *Virtue* of their *Moisture*; will doe the like.

Experiment Solitary, tou- ching the Qua- lification of Heat by Moi- sture.

684

IT hath beene noted by the *Ancients*, that it is dangerous to Pick ones *Eare*, whilest he *Yawneth*. The *Cause* is, for that in *Yawning*, the *Inner Parchment* of the *Eare* is extended, by the *Drawing* in of the *Spirit*, and *Breath*; For in *Yawning*, and *Sighing* both, the *Spirit* is first strongly Drawne in, and then strongly Expelled.

Experiment Solitary tou- ching Yawning.

685

IT hath beene observed by the *Ancients*, that *Sneezing* doth cease the *Hiccough*. The *Cause* is, for that the *Motion* of the *Hiccough* is a *Lifting* up of the *Stomacke*; which *Sneezing* doth somewhat depreffe, and divert the *Motion* another way. For first we see, that the *Hiccough* commeth of *Fulnesse* of *Meat*, (especially in *Children*;) which causeth an Extension of the *Stomacke*: Wee see also, it is caused by *Acide Meats*, or *Drinkes*, which is by the *Pricking* of the *Stomacke*: And this *Motion* is ceased ei- ther by *Diversion*; Or by *Detention* of the *Spirits*: *Diversion*, as in *Snee- zing*; *Detention*, as we see *Holding* of the *Breath*, doth helpe somewhat to cease the *Hiccough*: And putting a *Man* into an *Earnest Study* doth the like: As is commonly used: And *Vinegar* put to the *Nostrills*, or *Gargarized*, doth it also; For that it is *Astringent*, and inhibiteth the *Motion* of the *Spirits*.

Experiment Solitary, tou- ching the Hic- cough.

686

Looking

Experiment
Solitary, tou-
ching Sneezing.
687

Looking against the *Sunne*, doth induce *Sneezing*. The Cause is, not the *Heating* of the *Nostrills*; For then the *Holding up* of the *Nostrills* against the *Sunne*, though one *Winke*, would doe it; But the *Drawing* downe of the *Moisture* of the *Braine*: For it will make the *Eyes* run with *Water*; And the *Drawing* of *Moisture* to the *Eyes*, doth draw it to the *Nostrills*, by *Motion of Consent*; And so followeth *Sneezing*; As contrariwise, the *Tickling* of the *Nostrills* within, doth draw the *Moisture* to the *Nostrills*, and to the *Eyes* by *Consent*; For they also will *Water*. But yet, it hath beene observed, that if one be about to *Sneeze*, the *Rubbing* of the *Eyes*, till they run with *Water*, will prevent it. Whereof the Cause is, for that the *Humour*, which was descending to the *Nostrills*, is diverted to the *Eyes*.

Experiment
Solitary, tou-
ching the Ten-
dernesse of the
Teeth.
688

THe *Teeth* are more, by *Cold Drinke*, or the like, affected, than the other *Parts*. The Cause is double: The One, for that the *Resistance* of *Bone* to *Cold*, is greater than of *Flesh*; for that the *Flesh* shrinketh, but the *Bone* resisteth, whereby the *Cold* becommeth more eager: The Other is, for that the *Teeth* are *Parts* without *Bloud*, Whereas *Bloud* helpeth to qualifie the *Cold*: And therefore we see, that the *Sinnewes* are much affected with *Cold*; For that they are *Parts* without *Bloud*: So the *Bones* in *Sharpe Colds* wax *Brittle*: And therefore it hath beene seene, that all *Conusions* of *Bones*, in *Hardweather*, are more difficult to Cure.

Experiment
Solitary, tou-
ching the
Tongue.
689

It hath beene noted, that the *Tongue* receiveth, more easily, *Tokens* of *Diseases*, than the other *Parts*; As of *Heats* within, which appeare most in the *Blacknesse* of the *Tongue*. Againe, *Pied Catell* are spotted in their *Tongues*, &c. The Cause is, (no doubt,) the *Tendernesse* of the *Part*, which thereby receiveth more easily all *Alterations*, than any other *Parts* of the *Flesh*.

Experiment
Solitary, tou-
ching the
Taste.
690

When the *Mouth* is out of *Taste*, it maketh Things taste, sometimes *Salt*; Chiefely *Bitter*; And sometimes *Loathsome*; But never *Sweet*. The Cause is, the *Corrupting* of the *Moisture* about the *Tongue*; Which many times turneth *Bitter*, and *Salt*, and *Loathsome*; But *Sweet* never; For the rest are *Degrees* of *Corruption*.

Experiment
Solitary, tou-
ching some
Prognosticks of
Pestilentiall
Seasons.
691

It was observed in the *Great Plague* of the last Yeare, that there were seene, in divers *Ditches*, and low *Orounds*, about *London*, many *Toads*, that had *Tailes*, two or three Inches long, at the least; Whereas *Toads* (usually) have no *Tailes* at all. Which argueth a great *Disposition* to *Putrefaction* in the *Soile*, and *Aire*. It is reported likewise, that *Roots*, (such as *Carrots*, and *Parsnips*,) are more *Sweet*, and *Lushious*, in *Infectious Yeares*, than in other *Yeares*.

Experiment
Solitary, tou-
ching speciall
Simples for
Medicines.
692

Wise *Physicians* should with all diligence inquire, what *Simples* *Nature* yeeldeth, that have extreme *Subtile Parts*, without any *Mor-*
dication,

dication, or Acrimony: For they undermine that which is *Hard*; they open that which is *stopped*, & *Shut*; And they expell that which is *offensive*, gently, without too much *Perturbation*. Of this Kind are *Elder*, *Rowan*, which therefore are Proper for the *Stone*: Of this Kind is the *Utrage-Pine*; which is Proper for the *Jaundies*: Of this Kind is *Harts-Horn*, which is Proper for *Agues*, and *Infections*: Of this Kind is *Piony*: which is Proper for *Stoppings* in the *Head*: Of this Kind is *Fumitory*; which is Proper for the *Spleene*: And a Number of others. Generally, divers *Creatures* bred of *Putrefaction*, though they be somewhat loathsome to take, are of this kinde; As *Earth-wormes*, *Timber-Sowes*, *Sailes*, &c. And I conceive, that the *Trochisks* of *Vipers*, (which are so much magnified,) and the *Flesh* of *Snakes* some wayes condited, and corrected, (which of late are growne into some Credite,) are of the same Nature. So the *Parts* of *Beasts* *Putrified*, (as *Cassoreum*, and *Muske*, which have extreme *Subtill Parts*,) are to be placed amongst them. We see also that *Putrefactions* of *Plants*, (as *Agaricke*, and *Iewes-Eare*,) are of greatest Vertue. The Cause is, for that *Putrefaction* is the Subtillest of all *Motions*, in the *Parts* of *Bodies*: And since we cannot take down the *Lives* of *Living Creatures*, (which some of the *Paracelsians* say (if they could bee taken downe,) would make us *Immortall*;) the Next is for *Subtilty* of *Operation*, to take *Bodies* *Putrefied*; Such as may be safely taken.

IT hath beene observed by the *Ancients*, that *Much Use* of *Venus* doth *Dimme* the *Sight*; And yet *Eunuchs*, which are unable to generate are (neverthelesse) also *Dimme Sighted*. The Cause of *Dimmesse* of *Sight*, in the *Former*, is the *Expende* of *Spirits*: In the *Latter*, the *Over-moisture* of the *Braine*: For the *Over-moisture* of the *Braine* doth thicken the *Spirits* *Visuall*, and obstructeth their *Passages*; As we see by the *Decay*, in the *Sight*, in *Age*; Where also the *Diminution* of the *Spirits* concurrerth as another Cause: we see also that *Blindnesse* cometh by *Rhetumes*, and *Cataracts*. Now in *Eunuchs*, there are all the *Notes* of *Moisture*; As the *Swelling* of their *Thighes*, the *Loosenesse* of their *Belly*, the *Smoothnesse* of their *Skinne*, &c.

The *Pleasure* in the *Act* of *Venus*, is the greatest of the *Pleasures* of the *Senses*; The *Matching* of it with *Itch* is improper; though that also be *Pleasing* to the touch. But the Causes are *Profound*. First, all the *Organs* of the *Senses* qualifie the *Motions* of the *Spirits*; And make so many *Severall Species* of *Motions*, and *Pleasures* or *Displeasures* thereupon, as there be *Diversities* of *Organs*. The *Instruments* of *Sight*, *Hearing*, *Taste*, and *Smell*, are of severall frame; And so are the *Parts* for *Generation*. Therefore *Scaliger* doth well, to make the *Pleasure* of *Generation* a *sixth Sense*; And if there were any other differing *Organs*, and *Qualified Perforations*, for the *Spirits* to passe, there would be more than the *Five Senses*: Neither doe we well know, whether some *Beasts*, and *Birds*, have not *Senses* that we know not; And the very *Sense* of *Dogs* is almost a *Sense* by it selfe. Secondly, the *Pleasures* of the *Touch*, are greater and deeper

Experiments
in Conso
touching Venus

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deeper, than those of the other Senses; As we see in *Warming* upon *Cold*; Or *Refrigeration* upon *Heat*: For as the Paines of the *Touch*, are greater than the *Offences* of other Senses; So likewise are the *Pleasures*. It is true, that the *Affecting* of the *Spirits* immediately, and (as it were) without an *Organ*, is of the greatest *Pleasure*; Which is but in two things: *Sweet Smells*; And *wine*, and the like *Sweet Vapours*. For *Smells*, we see their great and sudden Effect in fetching *Men* againe, when they swoone: For *Drinke*, it is certaine, that the *Pleasure* of *Drunkenness*, is next the *Pleasure* of *Venus*: And *Great Ioyes* (likewise) make the *Spirits* move, and touch themselves: And the *Pleasure* of *Venus* is somewhat of the same *Kind*.

995

It hath beene alwayes observed, that *Men* are more inclined to *Venus* in the *winter*, and *Women* in the *Summer*. The *Cause* is, for that the *Spirits*, in a *Body* more *Hot* and *Dry*, as the *Spirits* of *Men* are,) by the *Summer* are more exhaled, and dissipated; And in the *Winter* more condensed, and kept entire: But in *Bodies* that are *Cold* and *Moist*, (as *women* are,) the *Summer* doth Cherish the *Spirits*, and calleth them forth; the *Winter* doth dull them. Furthermore, the *Abstinence*, or *Intermission* of the *Use* of *Venus*, in *Moist* and well habituate *Bodies*, breedeth a *Number* of *Diseases*; And especially dangerous *Impostumations*. The *Reason* is evident; For that it is a *Principall Evacuation*, especially of the *Spirits*: For of the *Spirits*, there is scarce any *Evacuation*, but in *Venus*, and *Exercise*. And therefore the *Omission* of either of them, breedeth all *Diseases* of *Repletion*.

Experiments
in Confort
touching the
Insecta.

The *Nature* of *Vivification* is very worthy the Enquiry: And as the *Nature* of *Things*, is commonly better perceived, in *Small*, than in *Great*; and in *unperfect*, than in *perfect*; and in *Parts*, than in *whole*: So the *Nature* of *Vivification* is best enquired in *Creatures* bred of *Putrefaction*. The *Contemplation* whereof hath many *Excellent Fruits*. First, in *Disclosing* the *Originall* of *Vivification*. Secondly, in *Disclosing* the *Original* of *Figuration*. Thirdly, in *Disclosing* many *Things* in the *Nature* of *Perfect Creatures*, which in them lye more hidden. And Fourthly, in *Traducing*, by way of *Operation*, some *Observations* in the *Insecta*, to worke *Effects* upon *Perfect Creatures*. Note that the word *Insecta* agreeth not with the *Matter*, but we ever use it for *Brevities* sake, intending by it *Creatures* bred of *Putrefaction*.

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The *Insecta* are found to breed out of severall *Matters*: Some breed of *Mud*, or *Dung*; As the *Earth-wormes*, *Eeles*, *Snakes*, &c. For they are both *Putrefactions*: For *Water* in *Mud* doth *Putrifie*, as not able to *Preserve* it selfe: And for *Dung*, all *Excrements* are the *Refuse* and *Putrefacti-*

ons of Nourishment. Some breed in *Wood*, both Growing, and Cut downe. *Quare* in what *Woods* most, & at what Seasons? We see that the *Wormes* with many Feet, which round themselves into Balls, are bred chiefly under *Logs* of *Timber*, but not in the *Timber*; And they are said to be found also, (many times,) in *Gardens*, where no *Logs* are. But it seemeth their *Generation* requireth a *Coverture*, both from *Sunne*, and *Raine*, or *Dew*; As the *Timber* is; And therefore they are not *Venomous*, but (contrariwise) are held by the *Physicians* to clarify the *Bloud*. It is observed also that *Cimices* are found in the *Holes* of *Bed-Sides*. Some breed in the *Haire* of *Living Creatures*; As *Lice*, and *Tikes*; which are bred by the *Sweat* close kept, and somewhat aried by the *Haire*. The *Excrements* of *Living Creatures*, do not only breed *Insecta*, when they are *Excerned*, but also while they are in the *Body*; As in *Wormes*, whereto *Children* are most subject, and are chiefly in the *Guts*. And it hath beene lately observed by *Physicians*, that in many *Pestilent Diseases*, there are *Wormes* found in the upper *Parts* of the *Body*, where *Excrements* are not, but onely *Humours Putrifed*. *Fleas* breed Principally of *Straw* or *Mats*, where there hath beene a little *Moisture*; Or the *Chamber* and *Bed-straw* kept close, and not *Aired*. It is received that they are killed by *Strewing Worme-wood* in the *Rooms*. And it is truly observed, that *Bitter Things* are apt, rather to kill, than engender *Putrefaction*; And they be *Things*, that are *Fat*, or *Sweet*, that are aptest to *Putrifie*. There is a *Worme*, that breedeth in *Meale*, of the shape of a large white *Maggot*, which is given as a great *Daintie* to *Nightingales*. The *Moth* breedeth upon *Cloth*, and other *Lanifices*; Especially if they be laid up dankish, and wet. It delighteth to be about the *Flame* of a *Candle*. There is a *Worme* called a *Wevill*, bred under *Ground*, and that feedeth upon *Roots*; As *Parsnips*, *Carrets*, &c. Some breed in *Waters*, especially shaded, but they must be *Standing-waters*; As the *water-spider*, that hath six *Legs*. The *Fly* called the *Gad-fly*, breedeth of somewhat that *Swimmeth* upon the *Top* of the *water*, and is most about *Ponds*. There is a *Worme* that breedeth of the *Dregs* of *Wine Decayed*; which afterwards, (as is observed by some of the *Ancients*,) turneth into a *Gnat*. It hath been observed by the *Ancients*, that there is a *Worme* that breedeth in old *Snow*, and is of *Colour Reddish*, and dull of *Motion*, and dieth soone after it commeth out of *Snow*. Which should shew, that *snow* hath in it a secret *Warmth*; For else it could hardly *Vivifie*. And the *Reason* of the *Dying* of the *Worme*, may be the sudden *Exhaling* of that little *Spirit*, as soone as it commeth out of the *Cold*, which had shut it in. For as *Butterflies* quicken with *Heat*, which were benumbed with *Cold*; So *Spirits* may exhale with *Heat*, which were Preserved in *Cold*. It is affirmed both by *Ancient* and *Moderne Observation*, that in *Furnaces* of *Copper*, and *Brasse*, where *Chalcites*, (which is *Vitrioll*), is often cast in, to mend the working, there riseth suddenly a *Fly*, which sometimes moveth, as if it tooke hold on the walls of the *Furnace*; Sometimes is seene moving in the *Fire* below; And dieth presently, as soone as it is out of the *Furnace*. Which is a *Noble Instance*, and worthy to be weighed; for it sheweth that as well

Violent Heat of Fire, as the *Gentle Heat of Living Creatures*, will Vivifie, if it have Matter Proportionable. Now the great *Axiome of Vivification* is, that there must be *Heat* to dilate the *Spirit of the Body*; An *Active Spirit* to be dilated; *Matter Viscous or Tenacious*, to hold in the *Spirit*; And that *Matter* to be put forth, and *Figured*. Now a *Spirit* dilated by so ardent a *Fire*, as that of the *Furnace*, as soone as ever it cooleth never so little, congealeth presently. And (no doubt) this *Action* is furthered by the *Chalcites*, which hath a *Spirit*, that will Put forth and germinate, as we see in *Chymicall Trialls*. Briefly, most *Things Putrified* bring forth *Insecta* of severall Names; But wee will not take upon us now, to Enumerate them all.

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The *Insecta* have beene noted by the *Ancients*, to feed little: But this hath not beene diligently observed; For *Grashoppers* eat up the *Greene* of whole *Countries*; And *Silke-wormes* devoure *Leaves* swiftly; And *Ants* make great Provision. It is true, that *Creatures*, that Sleepe and rest much, Eat little; As *Dormise*, and *Bats*, &c. They are all without *Bloud*: Which may be, for that the *Juyce* of their *Bodies*, is almost all one; Not *Bloud*, and *Flesh*, and *Skin*, and *Bone*, as in *Perfect Creatures*; The *Integrall Parts* have Extreme Varietie, but the *Similar Parts* little. It is true, that they have, (some of them,) a *Diaphragme*, and an *Intestine*; And they have all *Skins*; Which in most of the *Insecta* are cast often. They are not (generally) of long *Life*: Yet *Bees* have beene knowne to live seven yeares: And *Snakes* are thought, the rather for the *Casting* of their *Spoile*, to live till they be Old: And *Eeles*, which many times breed of *Putrefaction*, will live and grow verie long: And those that Enterchange from *wormes* to *Flyes* in the *Summer*, and from *Flyes* to *Wormes* in the *Winter*, have been kept in Boxes foure yeares at the least. Yet there are certaine *Flyes*, that are called *Ephemera*, that live but a day. The Cause is, the Exilitie of the *Spirit*; Or perhapsthe Absence of the *Sunne*; For that if they were brought in, or kept close, they might live longer. Many of the *Insecta*, (as *Butterflies*, and other *Flyes*,) revive easily, when they seeme dead, being brought to the *Sunne*, or *Fire*. The Cause whereof is, the Diffusion of the *Vitall Spirit*, and the Easie Dilating of it by a little *Heat*. They stirre a good while, after their *Heads* are off, or that they be cut in *Peeces*; Which is caused also, for that their *Vitall Spirits* are more diffused thorow-out all their *Parts*, and lesse confined to *Organs*, than in *Perfect Creatures*.

698

The *Insecta* have *Voluntarie Motion*, and therefore *Imagination*; And whereas some of the *Ancients* have said, that their *Motion* is Indeterminate, and their *Imagination* Indefinite, it is negligently observed; For *Ants* goe right forwards to their *Hills*; And *Bees* doe (admirably) know the way, from a *Flowrie Heath*, two or three Miles off, to their *Hives*. It may be, *Gnats*, and *Flyes*, have their *Imagination* more mutable, and giddy, as *Small Birds* likewise have. It is said by some of the *Ancients*, that they have onely the *Sense of Feeling*; which is manifestly untrue: For if they goe forth-right to a *Place*, they must needs have Sight:

Sight: Besides they delight more in one *Flower*, or *Herb*, than in another, and therefore have *Taste*: And *Bees* are called with *Sound* upon *Brasse*, and therefore they have *Hearing*: Which sheweth likewise that though their *Spirit* be diffused, yet there is a *Seat* of their *Senses* in their *Head*.

Other Observations concerning the *Insecta*, together with the Enumeration of them, wee referre to that place, where we meane to handle the Title of *Animal's* in generall.

A Man Leapeth better with *Weights*, in his *Hands*, than without. The Cause is, for that the *Weight*, (if it be proportionable,) strengtheneth the *Sinnewes*, by Contracting them. For otherwise, where no *Contraction* is needfull, *Weight* hindreth. As wee see in *Horse-Races*, *Men* are curious to fore-see, that there be not the least *Weight*, upon the one *Horse*, more than upon the other. In *Leaping* with *Weights*, the *Armes* are first cast backwards, and then forwards, with so much the greater Force: For the *Hands* goe backward before they take their *Raise*. *Quare*, if the contrarie *Motion* of the *Spirits*, immediately before the *Motion* we intend, doth not cause the *Spirits*, as it were, to breake forth with more Force: As *Breath* also drawne, and kept in, commeth forth more forcibly: And in *Casting* of any *Thing*, the *Armes*, to make a greater *Swing*, are first cast backward.

Experiment
Solitary, touching
Leaping.
699

OF *Musicall Tones*, and *Vnequall Sounds*, wee have spoken before; But touching the *Pleasure*, and *Displeasure* of the *Senses*, not so fully. *Harsh Sounds*, as of a *Saw*, when it is sharpened; *Grinding* of one *Stone* against another; *Squeaking*, or *Skriching* Noise; make a *Shivering* or *Horror* in the *Body*, and set the *Teeth* on edge. The Cause is, for that the *Objects* of the *Eare*, doe affect the *Spirits* (immediately) most with *Pleasure* and *Offence*. We see, there is no *Colour* that affecteth the *Eye* much with *Displeasure*: There be *Sights*, that are *Horrible*, because they excite the *Memorie* of *Things* that are *Odious*, or *Fearefull*; But the same *Things Painted* doe little affect. As for *Smells*, *Tastes*, and *Touches*, they be *Things* that doe affect, by a *Participation*, or *Impulsion* of the *Body*, of the *Object*. So it is *Sound* alone, that doth immediately, and incorporeally, affect most: This is most manifest in *Musicke*; and *Concords* and *Discords* in *Musicke*: For all *Sounds*, whether they be sharp, or Flat, if they be Sweet, have a *Roundnesse* and *Equalitie*; And if they be Harsh, are *Vnequall*: For a *Discord* it selfe is but a *Harshnesse* of *Divers Sounds Meeting*. It is true, that *Inequalitie*, not Stayed upon, but *Passing*, is rather an *Encrease* of *Sweetnesse*; As in the *Purling* of a *Wreathed String*; And in the *Raucitie* of a *Trumpet*; And in the *Nightingale-Pipe* of a *Regall*; And in a *Discord* straight falling upon a *Concord*: But if you stay upon it, it is *Offensive*; And therefore, there be these three *Degrees* of *Pleasing*,

Experiment
Solitary, touching the
Pleasures, and
Displeasures of
the *Senses*,
especially of
Hearing.
700

and *Displeasing* in Sounds; *Sweet Sounds*; *Discords*; and *Harsh Sounds*, which we call by divers Names, as *Skriching*, or *Grating*, such as we now speake of. As for the *Setting* of the *Teeth* on *Edge*, we see plainly, what an Intercourse there is, betweene the *Teeth*, and and the *Organ* of the *Hearing*, by the *Taking* of the *End* of a *Bow*, betweene the *Teeth*, and *Striking* upon the *String*.

NATU-



NATVRALL HISTORIE.

VIII. Century.



Here be *Mineralls*, and *Fossiles*, in great *Varie-*
tie; But of *Veines* of *Earth Medicinall*, but
 few; The Chiefe are, *Terra Lemnia*, *Terra*
Sigillata communis, and *Bolus Arminius*:
 Whereof *Terra Lemnia* is the Chiefe. The
Vertues of them are, for *Curing* of *Wounds*,
Stanching of *Bloud*, *Stopping* of *Fluxes* and
Rheumes, and *Arresting* the *Spreading* of *Poi-*
son, *Infection*, and *Putrefaction*: And they
 have, of all other *Simples*, the *Perfectest* and
 Purest *Qualitie* of *Drying*, with little or no *Mixture* of any other *Qual-*
itie. Yet it is true, that the *Bole-Arminick* is the most *Cold* of them; And
 that *Terra Lemnia* is the most *Hot*; For which Cause, the *Island Lemnos*,
 where it is digged, was in the Old *Fabulous Ages* consecrated to *Vulcan*.

About the *Bottom* of the *Straights* are gathered great *Quantities* of
Sponges, which are gathered from the *sides* of *Rocks*, being as it were
 a large, but tough, *Mass*. It is the more to be noted, because that there be
 but few *Substances*, *Plant-like*, that grow deepe within the *Sea*; For they
 are gathered sometimes fifteen *Fathome* deepe; And when they are laid

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Experiment
 Solitary tou-
 ching *Veines*
 of *Medicinall*
Earth.

701

Experiment
 Solitary tou-
 ching the
 Growth of
Sponges.

702

on Shoare, they seeme to be of great Bulke; But crushed together, will be transported in a verie small Rooke.

Experiment
Solitary touch-
ing Sea-Fish
put in Fresh
Waters.

703

IT seemeth, that *Fish*, that are used to the *Salt-Water*, doe neverthe-
lesse delight more in *Fresh*. We see, that *Salmons*, and *Smelts*, love to
get into *Rivers*, though it be against the *Streame*. At the *Haven of Con-
stantinople*, you shall have great *Quantities* of *Fish* that come from the
Euxine-Sea; that when they come into the *Fresh Water*, doe inebriate
and turne up their *Bellies*; So as you may take them with your Hand. I
doubt, there hath not beene sufficient *Experiment* made of Putting *Sea-
Fish* into *Fresh Water*, *Ponds*, and *Pooles*. It is a Thing of great Use, and
Pleasure: For so you may have them new at some good distance from
the *Sea*: And besides, it may be, the *Fish* will eat the pleasanter, and
may fall to breed: And it is said that *Colchester Oysters*, which are put in-
to Pits, where the *Sea* geth and commeth, (but yet so, that there is a
Fresh Water comming also to them, when the *Sea* voideth,) become by
that meanes Fatter, and more Growne.

Experiment
Solitary, touch-
ing *Attraction*
by Similitude of Sub-
stance.

704

THE *Turkish-Bow* giveth a verie Forcible Shoot; Insomuch as it hath
been knowne, that the *Arrow* hath pierced a *Steele Target*, or a Peece
of *Brasse* of two Inches thicke: But that which is more strange, the *Ar-
row*, if it be Headed with *Wood*, hath beene knowne to pierce thorow a
Peece of *Wood*, of eight Inches thicke. And it is certaine, that we had
in use at one time, for *Sea-Fight*, short *Arrowes*, which they called
Sprights, without any other Heads, save *Wood* sharpened; which were
discharged out of *Muskets*, and would pierce thorow the Sides of *Ships*,
where a *Bullet* would not pierce. But this dependeth upon one of the
greatest *Secrets* in all *Nature*; Which is, that *Similitude of Substance* will
cause *Attraction*, where the Body is wholly freed from the *Motion* of
Gravitie: For if that were taken away, *Lead* would draw *Lead*, and *Gold*
would draw *Gold*, and *Iron* would draw *Iron*, without the help of the
Lead-Stone. But this same *Motion of Weight* or *Gravitie*, (which is a meere
Motion of the *Matter*, and hath no *Affinitie* with the *Forme*, or *Kinde*,)
doth kill the other *Motion*, except it selfe be killed by a violent *Motion*;
As in these *Instances* of *Arrowes*; For then the *Motion of Attraction* by
Similitude of Substance, beginneth to shew it selfe. But we shall handle
this Point of *Nature* fully in due Place.

Experiment
Solitary touch-
ing certaine
Drincks in
Turkey.

705

THEY have in *Turkey*, and the *East*, certaine *Confections*, which they
call *Servetts*, which are like to *Candied Conserves*; And are made of
Sugar and *Lemons*, or *Sugar* and *Citrons*, or *Sugar* and *Violets*, and some
other *Flowers*; And some Mixture of *Amber* for the more delicate Per-
sons; And those they dissolve in *Water*, and thereof make their *Drinke*,
because they are forbidden *Wine* by their *Law*. But I doe much marvell,
that no *Englishman*, or *Dutchman*, or *German* doth set up *Brewing* in *Con-
stantinople*; Considering they have such *Quantitie* of *Barley*. For as for
the

the generall Sort of Men, Frugalitie may be the Cause of Drinking Water; For that it is no small Saving, to pay nothing for ones *Drinke*: But the better Sort mought well be at the Cost. And yet I wonder the lesse at it, because I see *France, Italy, or Spaine*, have not taken into use, *Beere, or Ale*; Which(perhaps) if they did, would better both their Healths, and their Complexions. It is likely it would be Matter of great Gaine to any, that should begin it in *Turkey*.

IN Bathing in Hot Water, Sweat (neverthelesse) commeth not in the Parts under the Water. The Cause is; First, for that Sweat is a Kinde of Colligation. And that Kinde of Colligation is not made, either by an Over-Drie Heat, or an Over-Moist Heat. For Over-Moisture doth somewhat extinguish the Heat; As wee see that even Hot Water quencheth Fire: And Over-Drie Heat shutteth the Pores: And therefore Men will sooner Sweat covered before the Sunne, or Fire, than if they stood Naked; And Earthen Bottles, filled with Hot Water, doe provoke, in Bed, a Sweat more daintily, than Bricke-bats Hot. Secondly, Hot Water doth cause Evaporation from the Skin; So as it spendeth the Matter, in those Parts under the Water, before it issueth in Sweat. Againe, Sweat commeth more plentifully, if the Heat be increased by Degrees, than if it be greatest at first, or equall. The Cause is, for that the Pores are better opened by a Gentle Heat, than by a more Violent; And by their opening the Sweat issueth more abundantly. And therefore Physitians may doe well, when they provoke Sweat in Bed, by Bottles, with a Decoction of Sudorificke Herbs in Hot Water, to make two Degrees of Heat in the Bottles; And to lay in the Bed, the lesse Heated first, and after halfe an Houre the more Heated.

Experiments
in Confort
touching
Sweat.

706

Sweat is Salt in Taste; The Cause is, for that, that Part of the Nourishment, which is Fresh and Sweet, turneth into Bloud, and Flesh; And the Sweat is only that Part which is Separate, and Excerned. Bloud also Raw hath some Saltnesse, more than Flesh; because the Assimilation into Flesh, is not without a little and subtile Excretion from the Bloud.

707

Sweat commeth forth more out of the Vpper Parts of the Body, than the Lower; The Reason is, because those Parts are more replenished with Spirits; And the Spirits are they that put forth Sweat: Besides, they are lesse Fleshy, and Sweat issueth (chiefly) out of the Parts that are lesse Fleshy, and more Dry; As the Forehead, and Breast.

708

Men Sweat more in Sleepe, than waking; And yet Sleepe doth rather stay other Fluxions, than cause them; As Rheumes, Loosenesse of the Body, &c. The Cause is, for that in Sleepe, the Heat and Spirits doe naturally move inwards, and there rest. But when they are collected once within, the Heat becommeth more Violent, and Irritate; And thereby expelleth Sweat.

709

Cold Sweats are (many times) Mortall, and neere Death; And alwayes ill, and Suspected; As in Great Feares, Hypochondriacall Passions, &c. The Cause is, for that Cold Sweats come by a Relaxation or Forsaking of the Spirits,

710

Spirits, whereby the *Moisture* of the *Body*, which *Heat* did keepe firme in the *Parts*, severeth, and issueth out.

711

In those *Diseases*, which cannot be discharged by *Sweat*, *Sweat* is ill, and rather to be stayed, As in *Diseases* of the *Lungs*, and *Fluxes* of the *Belly*; But in those *Diseases*, which are expelled by *Sweat*, it easeth and lightneth; As in *Agues*, *Pestilences*, &c. The *Cause* is, for that *Sweat* in the Latter Sort is partly *Criticall*, and sendeth forth the *Matter* that offendeth; But in the Former, it either proceedeth from the *Labour* of the *Spirits*, which sheweth them Oppressed; Or from *Motion* of *Consent*, when *Nature* not able to expell the *Disease*, where it is seated, moveth to an *Expulsion* indifferent over all the *Body*.

Experiment
Solitary, touch-
ing the
Glo-worme.

712

THE *Nature* of the *Glo-worme* is hitherto not well observed. Thus much wee see; That they breed chiefly in the *Hottest Moneths* of *Summer*; And that they breed not in *Champaigne*, but in *Busbes*, and *Hedges*. Whereby it may be conceived, that the *Spirit* of them is verie fine, and not to be refined, but by *Summer Heats*: And againe, that by reason of the *Finenesse*, it doth easily exhale. In *Italy*, and the *Hotter Countries*, there is a *Fly* they call *Lucciole*, that shineth as the *Glo-worme* doth; And it may be is the *Elying Glo-worme*. But that *Fly* is chiefly upon *Fens*, and *Marrishes*. But yet the two former *Observations* hold; For they are not seene, but in the *Heat* of *Summer*; And *Sedge*, or other *Greenne* of the *Fens*, give as good *Shade*, as *Busbes*. It may be the *Glo-wormes* of the *Cold Countries* ripen not so faire as to be *Winged*.

Experiments
in Consort
touching the
Impressions,
which the *Passions* of the
Minde make
upon the *Body*.

713

807

THE *Passions* of the *Minde*, worke upon the *Body* the *Impressions* following. *Feare* causeth *Palenesse*; *Trembling*; The *Standing* of the *Haire upright*; *Starting*; and *Skritchings*. The *Palenesse* is caused, for that the *Bloud* runneth inward, to succour the *Heart*. The *Trembling* is caused, for that through the *Flight* of the *Spirits* inward, the *Outward Parts* are destituted, and not sustained. *Standing Vpright* of the *Haire* is caused, for that by the *Shutting* of the *Pores* of the *Skin*, the *Haire* that lyeth asloape, must needs Rise. *Starting* is both an *Apprehension* of the *Thing feared*; (And, in that kinde, it is a *Motion* of *Shrinking*;) And likewise an *Inquisition*, in the beginning, what the *Matter* should be; (And in that kinde it is a *Motion* of *Erection*;) And therefore, when a *Man* would listen suddenly to any *Thing*, he *Starteth*; For the *Starting* is an *Erection* of the *Spirits* to attend. *Skitching* is an *Appetite* of *Expelling* that which suddenly striketh the *Spirits*: For it must be noted, that many *Motions*, though they be unprofitable to expell that which hurteth, yet they are *Offers* of *Nature*, and cause *Motions* by *Consent*; As in *Groaning*, or *Crying* upon *Paine*.

714

017

Griefe and *Paine* cause *Sighing*; *Sobbing*; *Groaning*; *Screaming*; and *Roaring*; *Tepres*; *Distorting* of the *Face*; *Grinding* of the *Teeth*; *Sweating*. *Sighing* is caused by the *Drawing* in of a greater *Quantity* of *Breath* to refresh the *Heart* that laboureth: like a great *Draught* when one is thirsty.

Sobbing

Sobbing is the same Thing stronger. *Groaning*, and *Screaming*, and *Roaring*, are caused by an *Appetite* of *Expulsion*, as hath beene said: For when the *Spirits* cannot expell the Thing that hurteth, in their Strife to do it, by *Motion* of *Consent*, they expell the *Voice*. And this is, when the *Spirits* yeeld, and give over to resist; For if one doe constantly resist *Paine*, he will not groane. *Tearcs* are caused by a *Contraction* of the *Spirits* of the *Braine*; Which *Contraction* by consequence astringeth the *Moisture* of the *Braine*, and thereby sendeth *Tearcs* into the *Eyes*. And this *Contraction*, or *Compression* causeth also *Wringing* of the *Hands*; For *Wringing* is a *Gesture* of *Expression* of *Moisture*. The *Distorting* of the *Face* is caused by a *Contention*, first to beare and resist, and then to expell; Which maketh the Parts knit first, and afterwards open. *Grinding* of the *Teeth* is caused (likewise) by a *Gathering* and *Serring* of the *Spirits* together to resist; Which maketh the *Teeth* also to set hard one against another. *Swearing* is also a *Compound Motion* by the *Labour* of the *Spirits*, first to resist, and then to expell.

Ioy causeth a *Chearefulnessse*, and *Vigour* in the *Eyes*; *Singing*; *Leaping*; *Dancing*; And sometimes *Tearcs*. All these are the *Effects* of the *Dilatation*, and *Comming* forth of the *Spirits* into the *Outward Parts*; Which maketh them more *Lively*, and *Stirring*. We know it hath beene scene, that *Excessive Sudden Ioy* hath causeth *Present Death*, while the *Spirits* did spread so much, as they could not retire againe. As for *Tearcs*, they are the *Effects* of *Compression* of the *Moisture* of the *Braine*, upon *Dilatation* of the *Spirits*. For *Compression* of the *Spirits* worketh an *Expression* of the *Moisture* of the *Braine*, by *Consent*, as hath beene said in *Griefe*. But then in *Ioy*, it worketh it diversly; viz. by *Propulsion* of the *Moisture*, when the *Spirits* dilate, and occupie more Roome.

Anger causeth *Palenessse* in some, and the *Going* and *Comming* of the *Colour* in Others: Also *Trembling* in some; *Swelling*; *Foaming* at the *Mouth*; *Stamping*; *Bending* of the *Fist*. *Palenessse*, and *Going* and *Comming* of the *Colour*, are caused by the *Burning* of the *Spirits* about the *Heart*; Which to refresh themselves call in more *Spirits* from the *Outward Parts*. And if the *Palenessse* be alone, without *Sending forth* the *Colour* againe, it is commonly joyned with some *Feare*; But in many there is no *Palenessse* at all, but contrariwise *Rednessse* about the *Cheekes*, and *Gills*; Which is by the *Sending forth* of the *Spirits* in an *Appetite* to *Revenge*. *Trembling* in *Anger* is likewise by a *Calling* in of the *Spirits*; And is commonly, when *Anger* is joyned with *Feare*. *Swelling* is caused, both by a *Dilatation* of the *Spirits* by *Over-Heating*, and by a *Liquefaction* or *Boylng* of the *Humours* thereupon. *Foaming* at the *Mouth* is from the same Cause, being an *Ebullition*. *Stamping*, and *Bending* of the *Fist*, are caused by an *Imagination* of the *Act* of *Revenge*.

Light Displeasure or *Dislike*, causeth *Shaking* of the *Head*; *Frowning*, and *Knitting* of the *Browes*. These *Effects* arise from the same Causes that *Trembling*, and *Morroure* doe; Namely, from the *Retiring* of the *Spirits*, but in a lesse degree. For the *Shaking* of the *Head* is but a *Slow* and *Definite*

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717

Definite Trembling; And is a Gesture of Slight Refusall: And we see also, that a Dislike causeth (often) that Gesture of the Hand, which wee use, when we refuse a Thing, or warne it away. The Frowning, and Knitting of the Browes, is a Gathering, or Serring of the Spirits, to resist in some Measure. And we see also, this Knitting of the Browes will follow upon earnest Studying, or Cogitation of any Thing, though it be without Dislike.

718

Shame causeth Blushing; And Casting downe of the Eyes. Blushing is the Resort of Bloud to the Face; Which in the Passion of Shame is the Part that laboureth most. And although the Blushing will be seene in the whole Breast, if it be Naked, yet that is but in Passage to the Face. As for the Casting downe of the Eyes, it proceedeth of the Reverence a Man beareth to other Men; Whereby, when he is ashamed, hee cannot endure to looke firmly upon Others: And we see that Blushing, and the Casting downe of the Eyes both, are more when wee come before Many; *Ore Pompeii quid mollis? Nunquam non coram pluribus erubuit:* And likewise when we come before Great, or Reverend Persons.

719

Pitie causeth sometimes Teares; And a Flexion or Cast of the Eye aside. Teares come from the same Cause that they doe in Griefe: for Pitie is but Griefe in Anothers Behalfe. The Cast of the Eye is a Gesture of Aversion, or Lothnesse to behold the Object of Pitie.

720

Wonder causeth Astonishment, or an Immoveable Posture of the Bodie; Casting up of the Eyes to Heaven; And Lifting up of the Hands. For Astonishment, it is caused by the Fixing of the Minde upon one Object of Cogitation, whereby it doth not spaciare and transcurre, as it useth: For in Wonder the Spirits flie not, as in Feare; But onely settle, and are made lesse apt to move. As for the Casting up of the Eyes, and Lifting up of the Hands, it is a Kinde of Appeal to the Deitie; Which is the Authour, by Power, and Providence, of Strange Wonders.

721

Laughing causeth a Dilatation of the Mouth, and Lips; A Continued Expulsion of the Breath, with the loud Noise, which maketh the Interjection of Laughing; Shaking of the Breast, and Sides; Running of the Eyes with Water, if it be Violent, and Continued. Wherein first it is to be understood, that Laughing is scarce (properly) a Passion, But hath his Source from the Intellect; For in Laughing there ever precedeth a Conceit of somewhat Ridiculous. And therefore it is Proper to Man. Secondly, that the Cause of Laughing is but a Light Touch of the Spirits, and not so deepe an Impression as in other Passions. And therefore, (that which hath no Affinitie with the Passions of the Minde,) it is moved, and that in great vehemencie, only by Tickling some Parts of the Body: And we see that Men even in a Grieved State of Minde, yet cannot sometimes forbear Laughing. Thirdly, it is ever joyned with some Degree of Delight: And therefore Exhilaration hath some Affinitie with Ioy, though it be a much Lighter Motion: *Res severa est verum Gaudium.* Fourthly, that the Object of it is Deformitie, Absurditie, Shrewd Turnes, and the like. Now to speake of the Causes of the Effects before mentioned, whereunto these

Generall

Generall Notes gives some Light. For the Dilatation of the Mouth and Lips, Continued Expulsion of the Breath and Voice, and Shaking of the Breast and Sides, they proceed (all) from the Dilatation of the Spirits. Especially being Sudden. So likewise, the Running of the Eyes with Water, (as hath beene formerly touched, where we spake of the Teares of Joy and Grief,) is an Effect of Dilatation of the Spirits. And for Suddenesse, it is a great Part of the Matter: For we see, that any Shrew'd Turner that lighteth upon Another; Or any Deformitie, &c. moveth Laughter in the Instant; Which after a little time it doth not. So we cannot Laugh at any Thing after it is Stale, but whilest it is New: And even in Tickling, if you Tickle the Sides, and give warning; Or give a Hard or Continued Touch, it doth not move Laughter so much.

Lust causeth a Flammorie in the Eyes; and Priapisme. The Cause of both these is, for that in Lust, the Sight, and the Touch, are the Things desired: And therefore the Spirits resort to those parts, which are most affected. And note well in general, (For that great Use may be made of the Observation,) that (evermore) the Spirits, in all Passions, resort most to the Parts, that labour most, or are most affected. As in the last, which hath been mentioned, they resort to the Eyes, and Venerous Parts: In Feare, and Anger, to the Heart: In Shame to the Face: And in Light Dislikes to the Head.

It hath beene observed by the Ancients, and is yet beleev'd, that the Sperme of Drunken Men is Vofruiſfull. The Cause is, for that it is Overmaistened, and wanteth Spissitude. And wee have a merrie Saying, that they that goe Drunke to Bed, get Daughters.

Drunken Men are taken with a plaine Defect, or Destitution in Voluntarie Motion. They Reele; They tremble; They cannot stand, nor speak strongly. The Cause is, for that the Spirits of the Wine, oppresse the Spirits Animall, and occupate Part of the Place, where they are; And so make them Weake to move. And therefore Drunken Men are apt to fall asleepe: And Opiales, and Stupratives, (as Poppy, Henbane, Hemlocke, &c.) induce a kinde of Drunkenesse, by the Grossenesse of their Vapour; As Wine doth by the Quantitie of the Vapour. Besides, they rob the Spirits Animall of their Matter, whereby they are nourished: For the Spirits of the Wine prey upon it, as well as they: And so they make the Spirits lesse Supple, and Apt to move.

Drunken Men imagine everie Thing turneth round; They imagine also that Things come upon them; They see not well Things a farre off; Those Things that they see neare hand, they see out of their Place; And (sometimes) they see Things double. The Cause of the Imagination that Things turne Round, is, for that the Spirits themselves turne, being compressed by the Vapour of the Wine: (For any Liquid Body upon Compression, turneth, as we see in Water.) And it is all one to the Sight, whether the Visuall Spirits move, or the Object moveth, or the Medium moveth. And wee see that long Turning Round breedeth the same Imagination.

The

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Experimentes
in Consort
touching
Drunkennesse.

723

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Experimentes
in Consort
touching
Drunkennesse.

725

Experimentes
in Consort
touching
Drunkennesse.

725

The Cause of the Imagination that Things come upon them, is, for that the Spirits Visual themselves draw backe; which maketh the Object seeme to come on; And besides, when they see Things turne Round; and Move, Feare maketh them thinke they come upon them. The Cause that they cannot see Things as farre off, is the Weaknesse of the Spirits; for In everie *Mégrim*, or *Vertigo*, there is an *Obiencration* joyned with a Semblance of *Turning round*; Which we see also in the lighter Sort of *swounings*. The Cause of Seeing things out of their Place, is the *Refraction* of the Spirits Visual; For the *Vapour* is as an *Unequall Medium*; And it is, as the Sight of Things, out of place, in *Water*. The Cause of Seeing Things double, is, the swift and *Vaguer* Motion of the Spirits, (being Oppressed,) to and fro; For, (as was said before,) the Motion of the Spirits Visual, and the Motion of the Object, make the same Appearances; And for the Swift Motion of the Object, wee see, that if you fillip a *Lute-string*, it sheweth double, or Treble.

Men are sooner Drunke with Small Draughts, than with Great. And againe, *Wine Sugred* inebriateth lesse, than *Wine Pure*. The Cause of the former is, for that the wine descendeth not so fast to the Bottom of the Stomach; But maketh longer Stay in the Upper Part of the Stomach, and sendeth Vapours faster to the Head; And therefore inebriateth sooner. And, for the same Reason, *Sops in Wine*, (Quantitie for Quantitie,) inebriate more, than *Wine* of it selfe. The Cause of the Latter is, for that the *Sugar* doth inspissate the Spirits of the Wine; and maketh them not so easie to resolve into Vapour. Nay further, it is thought, to be some Remedy against *Inebriating*, if *Wine Sugred* be taken after *Wine Pure*. And the same Effect is wrought either by *Oyle*, or *Milke*, taken upon much Drinking.

The Use of Wine, in Dry, and Consumed Bodies, is hurtfull; In Moist, and Full Bodies, it is good. The Cause is, for that the Spirits of the Wine doe prey upon the Dew, or Radicall Moisture, (as they terme it,) of the Body, and so deceive the Animall Spirits. But where there is Moisture Enough, or Superfluous, there Wine helpeth to digest, and deficcate the Moisture.

The Catterpillar is one of the most Generall of Wormes, and breedeth of Dew, and Leaves: For wee see infinite Number of Catterpillers, which breed upon Trees, and Hedges; By which the Leaves of the Trees, or Hedges, are in great Part consumed; As well by their Breeding out of the Lease, as by their Feeding upon the Lease. They breed in the Spring chiefly, because then there is both Dew, and Lease. And they breed commonly when the East Winds have much blowne: The Cause whereof is, the Drinessse of that Wind: For to all Vivification upon Putrefaction, it is requisite the Matter be not too Moist: And therefore we see, they have Copwebs about them, which is a signe of a Slimy Drinessse: As we see upon the Ground, whereupon, by Dew, and Sunne, Copwebs breed all over.

We

Experiment
Solitary, touching the
Help or Hurt of
Wine, though
Moderately
used.

Experiment
Solitary, touching Catter-
pillers.

We see also the *Greene Caterpillar* breedeth in the Inward Parts of *Roses*, especially not blowne, where the *Deu* sticketh: But especially *Caterpillers*, both the greatest, and the most, bred upon *Cabbages*, which have a *Fat Lease*, and apt to *Putrifie*. The *Caterpillar* towards the *End of Summer* waxeth *Volatile*, and turneth to a *Butterfly*, or perhaps, some other *Fly*. There is a *Caterpillar*, that hath a *Furre*, or *Downe* upon him, and seemeth to have *Affinitie* with the *Silke-worme*.

THe *Flyes Cantharides* are bred of a *Worme*, or *Caterpillar*, but peculiar to certaine *Fruit-Trees*; As are the *Fig-tree*, the *Pine-tree*, and the *Wilde Briar*; All which beare *Sweet Fruit*; And *Fruit* that hath a kinde of secret *Biting*, or *Sharpnesse*: For the *Fig* hath a *Milke* in it, that is *Sweet*, and *Corrosive*: The *Pine-Apple* hath a *Kernell* that is *Strong* and *Abster-sive*: The *Fruit* of the *Briar* is said to make *Children*, or those that Eat them, *Scabbed*. And therefore, no marvell though *Cantharides* have such a *Corrosive*, and *Cauterizing Quality*; For there is not any other of the *In-secta*, but is bred of a *Duller Matter*. The *Body* of the *Cantharides* is bright coloured; And it may be, that the delicate-coloured *Dragon-Flies*, may have likewise some *Corrosive Qualitie*.

Lassitude is remedied by *Bathing*, or *Annointing* with *Oyle*, and *Warmed Water*. The *Cause* is, for that all *Lassitude* is a kinde of *Contusion*, and *Compression* of the *Parts*; And *Bathing*, and *Annointing* give a *Relaxation*, or *Emolition*: And the *Mixture* of *Oyle*, and *Water*, is better than either of them alone; Because *Water* Entreth better into the *Pores*, and *Oyle* after Entry softneth better. It is found also, that the *Taking* of *Tobacco* doth helpe and discharge *Lassitude*. The *Reason* whereof is, partly, because by *Chearing* or *Comforting* of the *Spirits*, it openeth the *Parts Compressed*, or *Contused*: And chiefly, because it refresheth the *Spirits* by the *Opiate Vertue* thereof; And so dischargeth *Wearinesse*; as *Sleepe* likewise doth.

In *Going up a Hill*, the *Knees* will be most *Weary*; In *Going downe a Hill*, the *Thighes*. The *Cause* is, for that, in the *Lift* of the *Feet*, when a *Man Goeth up the Hill*, the *Weight* of the *Body* beareth most upon the *Knees*; And in *Going downe the Hill*, upon the *Thighes*.

THe *Casting* of the *Skin*, is by the *Ancients* compared, to the *Breaking* of the *Secundine*, or *Call*; but not rightly: For that were to make every *Casting* of the *Skin* a *New Birth*: And besides, the *Secundine* is but a generall *Cover*, not shaped according to the *Parts*; But the *Skin* is shaped according to the *Parts*. The *Creatures*, that cast their *Skin*, are; The *Snake*, the *Viper*, the *Grashopper*, the *Lizard* the *Silke-worme*, &c. Those that cast their *Shell*, are; The *Lobster*, the *Crab*, the *Crawfish*, the *Hodman-dod* or *Didman*, the *Tortoise*, &c. The *Old Skins* are found, but the *Old Shells* never: So as it is like, they scale off, and crumble away by degrees. And they are knowne, by the *Extream Tenderesse* and *Softnesse* of

Experiment
Solitary, tou-
ching the *Flyes*
Cantharides.

729

Experiments
in Confort,
touching *Laf-*
situde.

730

731

Experiment
Solitary, tou-
ching the *Ca-*
sting of the
Skin, and *Shell*,
in some *Crea-*
tures.

732

of the *New Shell*; And somewhat by the *Freshnesse* of the *Colour* of it. The *Cause* of the *Casting* of *Skin*, and *Shell*, should seeme to be the great *Quantitie* of *Matter* in those *Creatures*, that is fit to make *Skin*, or *Shell*; And againe, the *Loosenesse* of the *Skin*, or *Shell*, that sticketh not close to the *Flesh*. For it is certaine, that it is the *New Skin*, or *Shell*, that putteth off the *Old*: So we see, that in *Deere*, it is the *Young Horne*, that putteth off the *Old*; And in *Birds*, the *Young Feathers* put off the *Old*: And so *Birds*, that have much *Matter* for their *Beake*, cast their *Beakes*; the *New Beake* Putting off the *Old*.

Experiments
in Confort,
touching the
Postures of the
Body.

733

Lying, not *Erect*, but *Hollow*, which is in the Making of the *Bed*; Or with the *Legs gathered up*, which is in the Posture of the *Body*, is the more *Wholesome*. The *Reason* is, the better *Comforting* of the *Stomach*, which is by that lesse *Penfile*: And we see, that in *Weake Stomachs*, the *Laying up* of the *Legs high*, and the *Knees almost to the Mouth*, helpeth, and comforteth. We see also that *Gally-slaves*, notwithstanding their *Miserie* otherwise, are commonly *Fat and Flethy*; And the *Reason* is, because the *Stomach* is supported somewhat in *Sitting*; And is *Penfile* in *Standing*, or *Going*. And therefore, for *Prolongation of Life*, it is good to choose those *Exercises*, where the *Limbs* move more than the *Stomach*, and *Belly*; As in *Rowing*, and in *Sawing being Set*.

734

Megrims and *Giddinesse* are rather when we *Rise*, after long *Sitting*, than while we *Sit*. The *Cause* is, for that the *Vapours*, which were gathered by *Sitting*, by the *Sudden Motion*, fly more up into the *Head*.

735

Leaning long upon any *Part* maketh it *Numme*, and, as wee call it, *Asleepe*. The *Cause* is, for that the *Compression* of the *Part* suffereth not the *Spirits* to have free *Accesse*; And therefore, when wee come out of it, wee feelee a *Stinging*, or *Pricking*; Which is the *Re-entrance* of the *Spirits*.

Experiment
Solitary, touch-
ing *Pestilentiall*
Yeares.

736

IT hath been noted, that those *Yeares* are *Pestilentiall*, and *Vnwholesome*, when there are great *Numbers* of *Frogs*, *Flyes*, *Locusts*, &c. The *Cause* is plaine; For that those *Creatures* being engendred of *Putrefaction*, when they abound, shew a generall *Disposition* of the *Yeare*, and *Constitution* of the *Aire*, to *Diseases* of *Putrefaction*. And the same *Prognosticke*, (as hath beene said before,) holdeth, if you finde *Wormes* in *Oake-Apples*. For the *Constitution* of the *Aire*, appeareth more subtilly, in any of these *Things*, than to the *Sense* of *Man*.

Experiment
Solitary, touch-
ing the
Prognosticks of
Hard Winters.

737

IT is an *Observation* amongst *Country-People*, that *Yeares* of *Store* of *Hawes* & *Heps*, do commonly portend *Cold Winters*; And they ascribe it to *Gods Providence*, that, (as the *Scripture* saith) reacheth even to the *Falling of a Sparrow*; And much more is like to reach to the *Preservation* of *Birds* in such *Seasons*. The *Naturall Cause* also may be the *Want* of *Heat*, and *Abundance* of *Moisture*, in the *Summer* precedent; Which putteth forth those *Fruits*, and must needs leave great *Quantitie* of *Cold Vapours*,

pours, not dissipate; Which causeth the Cold of the winter following.

They have in Turkey, a *Drinke* called *Coffa*, made of a *Berrie* of the same Name, as Blacke as *Soot*, and of a *Strong Sent*, but not *Aromaticall*; Which they take, beaten into Powder, in *Water*, as Hot as they can drinke it: And they take it, and sit at it, in their *Coffa-Houses*, which are like our *Tavernes*. This *Drinke* comforteth the *Braine*, and *Heart*, and helpeth *Disgestion*. Certainly this *Berrie Coffa*; The *Root*, and *Leafe Betel*; The *Leafe Tobacco*; And the *Tearre* of *Poppy*, (*Opium*;) of which the *Turks* are great *Takers*, (supposing it expelleth all *Feare*;) doe all *Condense* the *Spirits*, and make them *Strong*, and *Aleger*. But it seemeth they are taken after severall manners; For *Coffa* and *Opium* are taken downe; *Tobacco* but in *smoake*; And *Betel* is but champed in the *Mouth*, with a little *Lime*. It is like there are more of them, if they were well found out, and well corrected. *Quere* of *Henbane-Seed*; Of *Mandrake*; Of *Saffron*, *Root*, and *Flower*; Of *Folium Indum*; Of *Amber-grice*; Of the *Assyrian Amomum*, if it may be had; And of the *Scarlet Powder*, which they call *Kermiz*; And (generally) of all such Things, as doe inebriate, and provoke *leepe*. Note that *Tobacco* is not taken in *Root*, or *Seed*, which are more forcible ever than *Leaves*.

Experiment
Solitary, touching
Medicines that Condense,
and Relieve the Spirits.

738

The *Turkes* have a *Blacke Powder*, made of a *Minerall* called *Alcohole*; Which with a fine long *Pencill* they lay under their *Eye-lids*; Which doth colour them *Blacke*; Whereby the *White* of the *Eye* is set off more *white*. With the same *Powder* they colour also the *Haires* of their *Eye-lids*, and of their *Eye-browes*, which they draw into *Embowed Arches*. You shall finde that *Xenophon* maketh Mention, that the *Medes* used to paint their *Eyes*. The *Turkes* use with the same *Tincture*, to colour the *Haire* of their *Heads* and *Beards* *Blacke*: And divers with us, that are growne *Gray*, and yet would appeare *Young*, finde meanes to make their *Haire* *blacke*, by *Combing* it, (as they say,) with a *Leaden Combe*, or the like. As for the *Chineses*, who are of an ill *Complexion*, (being *Olivaster*;) they paint their *Cheekes* *Scarlet*; Especially their *King*, & *Grandes*. Generally, *Barbarous People*, that goe *Naked*, doe not onely paint *Themselves*, but they pounce and raze their *Skinne*, that the *Painting* may not be taken forth; And make it into *Works*. So doe the *West Indians*; And so did the *Ancient Persians*, and *Brittons*; So that it seemeth, *Men* would have the *Colours* of *Birds Feathers*, if they could tell how; Or at least, they will have *Gay Skins*, in stead of *Gay Cloathes*.

Experiment
Solitary, touching
Paintings of the Body.

739

It is strange, that the use of *Bathing*, as a Part of *Diet*, is left. With the *Romans*, and *Grecians*, it was as usuall as *Eating*, or *Sleeping*: And so is it amongst the *Turkes* at this day: Whereas with us it remaineth but as a Part of *Physicke*. I am of Opinion, that the Use of it, as it was with the *Romans*, was hurtfull to *Health*; For that it made the *Body* *Soft*, and easie to *Waste*. For the *Turkes* it is more proper, because that their *Drin-*

Experiment
Solitary touching the use
of Bathing and Anointing.

740

king Water, and Feeding upon Rize, and other Food of small Nourishment, maketh their Bodies so Solide, and Hard, as you need not feare that Bathing should make them Froathy. Besides, the Turkes are great Sitters, and seldome walke; Whereby they Sweat lesse, and need Bathing more. But yet certaine it is, that Bathing, and especially Anointing, may be so used, as it may be a great Help to Health, and Prolongation of Life. But hereof we shall speake in due Place, when we come to handle Experiments Medicinall.

Experiment
Solitary, touching Chamo-
letting of Paper.

741

The Turkes have a Prettie Art of Chamoletting of Paper, which is not with us in use. They take divers Oyled Colours, and put them severally (in drops) upon Water; And stirre the Water lightly; And then wet their Paper, (being of some Thickness,) with it; And the Paper will be Waved, and Veined, like Chamolet, or Marble.

Experiment
Solitary, touching Cattle-
Inke.

742

It is somewhat strange, that the Bloud of all Birds, and Beasts, and Fishes, should be of a Red Colour, and onely the Bloud of the Cuttle should be as Blacke as Inke. A Man would thinke, that the Cause should be the High Concoction of that Bloud; For we see in ordinarie Puddings, that the Boyling turneth the Bloud to be Blacke; And the Cuttle is accounted a delicate Meat, and is much in Request.

Experiment
Solitary, touching Increase
of weight in
Earth.

743

It is reported of Credit, that if you take Earth, from Land adjoyning to the River of Nile; And preserve it in that manner, that it neither come to be Wet, nor Wasted; And Weigh it daily, it will not alter Weight untill the seventeenth of June, which is the Day when the River beginneth to rise; And then it will grow more and more Ponderous, till the River commeth to his Heighth. Which if it be true, it cannot be caused, but by the Aire, which then beginneth to Condense; And so turneth within that Small Mould into a degree of Moisture; Which produceth weight. So it hath beene observed, that Tobacco, Cut, and Wighed, and then Dried by the Fire, loseth Weight; And after being laid in the open Aire, recovereth Weight againe. And it should seeme, that as soone as ever the River beginneth to increase, the whole Body of the Aire thereabouts suffereth a Change: For (that which is more strange,) it is credibly affirmed, that upon that verie Day, when the River first riseth, great Plagues, in Cairo, use suddenly to breake up.

Experiments
in Confort
touching
Sleepe.

744

Those that are verie Cold, and especially in their Feet, cannot get to sleepe. The Cause may be, for that in sleepe is required a Free Respiration, which Cold doth shut in, and hinder: For wee see, that in great Colds, one can scarce draw his Breath. Another Cause may be, for that Cold calleth the Spirits to succour; And therefore they cannot so well close, and goe together in the Head; Which is ever requisite to sleepe. And for the same Cause, Paine, and Noise hinder sleepe; And Darknesse (contrariwise) furthereth sleepe.

Some

Some Noises (whereof wee spake in the 112. Experiment) helpe sleepe; As the Blowing of the Wind, the Trickling of water, Humming of Bees, Soft Singing, Reading, &c. The Cause is, for that they move in the Spirits a gentle Attention; And whatsoever moveth Attention, without too much Labour, stilleth the Naturall and discursive Motion of the Spirits.

Sleepe nourisheth, or at least preserveth Bodies, a long time, without other Nourishment. Beasts that sleepe in Winter, (as it is noted of wilde Beares,) during their Sleepe wax verie Fat, though they Eat nothing. Bats have beene found in Ovens, and other Hollow Close Places, Matted one upon another; And therefore it is likely that they Sleepe in the winter time, and eat Nothing. Quere, whether Bees doe not sleepe all Winter, and spare their Honey? Butterflies, and other Flies, doe not onely sleepe, but lye as Dead all Winter; And yet with a little Heat of Sunne, or Fire, revive againe. A Dormouse, both Winter and Summer, will Sleepe some dayes together, and eat Nothing.

To restore Teeth in Age, were Magnale Nature. It may be thought of. But howsoever the Nature of the Teeth deserveth to be enquired of, as well as the other Parts of Living Creatures Bodies.

There be Five Parts in the Bodies of Living-Creatures, that are of Hard Substance; The Skull; The Teeth; The Bones; The Hornes; & the Nails. The greatest Quantitie of Hard Substance Continued, is towards the Head. For there is the Skull of one Entire Bone; There are the Teeth; There are the Maxillarie Bones; There is the Hard Bone, that is the Instrument of Hearing; And thence issue the Hornes. So that the Building of Living Creatures Bodies, is like the Building of a Timber-House, where the Walls, and other Parts have Columnes, and Beames; But the Roofe is, in the better Sort of Houses, all Tile, or Lead, or Stone. As for Birds, they have Three other Hard Substances proper to them; The Bill, which is of like Matter with the Teeth; For no Birds have Teeth: The Shell of the Egge: And their Quills: For as for their Spurre, it is but a Nail. But no Living-Creatures, that have Shells verie hard; (As Oysters, Cockles, Mussels, Scallops, Crabs, Lobsters, Cra-fish, Shrimps, and especially the Tortoise,) have Bones within them, but onely little Gristles.

Bones, after full Growth, continue at a Stay: And so doth the Skull: Hornes, in some Creatures, are cast, and renewed: Teeth stand at a Stay except their Wearing: As for Nails, they grow continually: And Bills and Beakes will over-grow, and sometimes be cast; as in Eagles, and Parrots.

Most of the Hard Substances fly to the Extremes of the Body; As Skull, Hornes, Teeth, Nails, and Beakes: Onely the Bones are more Inward, and clad with Flesh. As for the Entrailes, they are all without Bones; Save that a Bone is (sometimes) found in the Heart of a Stag; And it may be in some other Creature.

745

746

Experiments
in Consort
touching Teeth
and Hard Sub-
stances in the
Bodies of Living
Creatures.

747

748

749

750

The *skull* hath *Braines*, as a kinde of *Marrow*, within it. The *Back-Bone* hath one Kinde of *Marrow*, which hath an Affinitie with the *Braine*; And other *Bones* of the *Body* have another. The *Jaw-Bones* have no *Marrow* Severed, but a little *Pulp* of *Marrow* diffused. *Teeth* likewise are thought to have a kinde of *Marrow* diffused, which causeth the *Sense*, and *Paine*: But it is rather *Sinners*; For *Marrow* hath no *Sense*; No more than *Bloud*. *Horne* is alike throughout; And so is the *Nail*.

751

None other of the *Hard Substances* have *Sense*, but the *Teeth*: And the *Teeth* have *Sense*, not onely of *Paine*, but of *Cold*.

But we will leave the Enquiries of other *Hard Substances*, unto their severall Places; And now enquire onely of the *Teeth*.

752

The *Teeth* are, in *Men*, of three Kindes: *Sharp*, as the *Fore-Teeth*; *Broad*, as the *Back-Teeth*, which we call the *Molar-Teeth*, or *Grinders*; And *Pointed-Teeth*, or *Canine*, which are betweene both. But there have been some *Men*, that have had their *Teeth* undivided, as of one whole *Bone*, with some little *Marke* in the Place of the Division; As *Pyrhus* had. Some *Creatures* have *Over-long*, or *Out-growing Teeth*, which wee call *Fangs*, or *Tuskes*; As *Boares*, *Pikes*, *Salmons*, and *Dogs* though lesse. Some *Living Creatures* have *Teeth* against *Teeth*; As *Men*, and *Horses*; And some have *Teeth*, especially their *Master-Teeth*, indented one within another, like *Sawes*; As *Lions*; And so againe have *Dogs*. Some *Fishes* have divers *Rowes* of *Teeth* in the *Roofes* of their *Mouths*; As *Pikes*, *Salmons*, *Troues*, &c. And many more in *Salt-Waters*. *Snakes*, and other *Serpents*, have *Venomous Teeth*; which are sometimes mistaken for their *Sting*.

753

No *Beast* that hath *Hornes*, hath *Vpper Teeth*; And no *Beast*, that hath *Teeth* above, wanteth them below: But yet if they be of the same kinde, it followeth not, that if the *Hard Matter* goeth not into *Vpper Teeth*, it will goe into *Hornes*; Nor yet *converso*; For *Doe's*, that have no *Hornes*, have no *Vpper Teeth*.

754

Horses have, at three yeares old, a *Tooth* put forth, which they call the *Colts Tooth*; And at foure yeares old there commeth the *Mark-Tooth*, which hath a *Hole*, as big as you may lay a *Pease* within it; And that weareth shorter and shorter, everie yeare; Till that at eight yeares old, the *Tooth* is smooth, and the *Hole* gone; And then they say; That the *Marke* is out of the *Horses Mouth*.

755

The *Teeth* of *Men* breed first, when the *Childe* is about a yeare and halfe old: And then they cast them, and new come about seven yeares old. But divers have *Backward-Teeth* come forth at Twentie, yea some at Thirtie, and Fortie. Quere of the manner of the *Comming* of them forth. They tell a Tale of the old *Countesse* of *Desmond*, who lived till shee was seven-score yeares old, that shee did *Dentire*, twice, or thrice; Casting her old *Teeth*, and others *Comming* in their Place.

756

Teeth are much hurt by *Sweet-Meats*; And by *Painting* with *Mercurie*; And by *Things Over-hot*; And by *Things Over-cold*; And by *Rheumes*. And the *Paine* of the *Teeth*, is one of the sharpest of *Paines*.

Concerning

Concerning *Teeth*, these Things are to be Considered. 1. The *Preserving* of them. 2. The *Keeping* of them *White*. 3. The *Drawing* of them with *Least Pain*. 4. The *Staying* and *Easing* of the *Tooth-ach*. 5. The *Binding* in of *Artificiall Teeth*, where *Teeth* have beene stricken out. 6. And last of all, that Great One, of *Restoring Teeth in Age*. The *Instances* that give any likelihood of *Restoring Teeth in Age*, are; The *Late Comming* of *Teeth* in some; And the *Renewing* of the *Beakes* in *Birds*, which are *Commateriall* with *Teeth*. *Quare* therefore more particularly how that commeth. And againe, the *Renewing* of *Hornes*. But yet that hath not beene knowne to have beene provoked by *Art*; Therefore let *Triall* be made, whether *Hornes* may be procured to grow in *Beasts* that are not *Horned*, and how? And whether they may be procured to come *Larger* than usuall; As to make an *Oxe*, or a *Deere*, have a *Greater Head* of *Hornes*? And whether the *Head* of a *Deere*, that by *Age* is more *Spitted*, may be brought againe to be more *Branched*; For these *Trialls*, and the like, will shew, whether by *Art* such *Hard Matter* can be called, and provoked. It may be tried also, whether *Birds* may not have some thing done to them, when they are *Young*, wherby they may be made to have *Greater*, or *Longer Bills*; Or *Greater* and *Longer Talons*? And whether *Children* may not have some *Wash*, or Some thing to make their *Teeth* *Better*, and *Stronger*? *Corall* is in use as an *Help* to the *Teeth* of *Children*.

SOME *Living Creatures* generate but at certaine *Seasons* of the *Yeare*; As *Deere*, *Sheepe*, *Wilde Conneyes*, &c. And most *Sorts* of *Birds*, and *Fishes*: Others at *any time* of the *Yeare*, as *Men*; And all *Domestick Creatures*; As *Horses*, *Hogs*, *Dogs*, *Cats*, &c. The *Cause* of *Generation* at all *Seasons* seemeth to be *Fulnesse*: For *Generation* is from *Redundance*. This *Fulnesse* ariseth from two *Causes*; Either from the *Nature* of the *Creature*, if it be *Hot*, and *Moist*, and *Sanguine*; Or from *Plentie* of *Food*. For the first, *Men*, *Horses*, *Dogs*, &c. which breed at all *Seasons*, are full of *Heat*, and *Moisture*; *Doves* are the fullest of *Heat* and *Moisture* amongst *Birds*, and therefore breed often; The *Tame Dove* almost continually. But *Deere* are a *Melancholy Dry Creature*, as appeareth by their *Fearfulness*, and the *Hardnesse* of their *Flesh*. *Sheepe* are a *Cold Creature*, as appeareth by their *Mildnesse*, and for that they seldome *Drinke*. Most sort of *Birds* are of a *dry Substance* in comparison of *Beasts*. *Fishes* are *cold*. For the second *Cause*, *Fulnesse* of *Food*; *Men*, *Kine*, *Swine*, *Dogs*, &c. feed full; And we see that those *Creatures*, which being *Wilde*, generate seldome, being *Tame*, generate often; Which is from *Warmth*, and *Fulnesse* of *Food*. We finde, that the *Time* of *Going to Rut* of *Deere* is in *September*; For that they need the whole *Summers Feed* and *Grasse*, to make them fit for *Generation*. And if *Raine* come *Earely* about the *Middle* of *September*, they goe to *Rut* somewhat the sooner; If *Drought*, somewhat the later. So *Sheepe*, in respect of their small *Heat*, generate about the same time, or somewhat before. But for the most part, *Creatures* that generate at cer-
taine

Experiments
in Consort,
touching the
Generation &
Bearing of Li-
ving Creatures
in the Wombe.

tainc *Seasons*, generate in the *Spring*; As *Birds*, and *Fishes*; For that the *End* of the *Winter*, and the *Heat*, and *Comfort* of the *Spring* prepareth them. There is also another *Reason*, why some *Creatures* generate at certaine *Seasons*: And that is the *Relation* of their *Time* of *Bearing*, to the time of *Generation*: For no *Creature* goeth to generate, whilst the *Female* is full; Nor whilst shee is busie in *Sitting* or *Rearing* her *Young*. And therefore it is found by *Experience*, that if you take the *Egges*, or *Young Ones*, out of the *Nests* of *Birds*, they will fall to generate againe, three or foure times, one after another.

759

Of *Living Creatures*, some are *Longer time* in the *Womb*, and some *Shorter*. *Women* goe commonly nine *Moneths*; The *Cow* and the *Ewe* about six *Moneths*; *Doe's* goe about nine *Moneths*; *Mares* eleven *Moneths*; *Bitches* nine *Weekes*; *Elephants* are said to goe two *Yeares*; For the *Received Tradition* of ten *Yeares* is *Fabulous*. For *Birds* there is double *Enquirie*; The *Distance* betweene the *Treading* or *Coupling*, and the *Laying* of the *Egge*; And againe betweene the *Egge Layed*, and the *Dischasing* or *Hatching*. And amongst *Birds*, there is lesse *Diversitie* of *Time*, than amongst other *Creatures*; yet some there is: For the *Hen* sitteth but three *Weekes*; The *Turkey-Hen*, *Goose*, and *Ducke*, a *Moneth*: *Quare* of others. The *Cause* of the great *Difference* of *Times*, amongst *Living Creatures*, is, Either from the *Nature* of the *Kinde*; Or from the *Constitution* of the *Womb*. For the former, those that are longer in *Comming* to their *Maturitie* or *Growth*, are longer in the *Womb*; As is chiefly scene in *Men*; And so *Elephants* which are long in the *Womb*, are long time in *Comming* to their full *Growth*. But in most other *Kindes*, the *Constitution* of the *Womb*, (that is, the *Hardnesse* or *Driness* thereof,) is concurrent with the former *Cause*. For the *Colt* hath about foure *yeares* of *Growth*; And so the *Fawne*; And so the *Calf*. But *Whelps*, which come to their *Growth* (commonly) within three *Quarters* of a *yeare*, are but nine *Weekes* in the *Womb*. As for *Birds*, as there is lesse *Diversitie*, amongst them, in the time of their *Bringing forth*; So there is lesse *Diversitie* in the time of their *Growth*; Most of them *comming* to their *Growth* within a *Twelve-Moneth*.

760

Some *Creatures* bring forth many *Young Ones* at a *Burthen*; As *Bitches*, *Hares*, *Conneges*, &c. Some (ordinarily) but *One*; As *women*, *Lionesses*, &c. This may be caused, either by the *Quantitie* of *Sperme* required to the *Producing One* of that *Kinde*; which if lesse be required, may admit greater *Number*; If more, fewer: Or by the *Partitions* and *Cells* of the *Womb*, which may sever the *Sperme*.

Experiments
in Consort,
touching Spe-
cies Visible.

761

There is no doubt, but *Light* by *Refraction* will shew greater, as well as *Things Coloured*. For like as a *Shilling*, in the *Bottom* of the *Water*, will shew greater; So will a *Candle* in a *Lanthe*, in the *Bottom* of the *Water*. I have heard of a *Practice*, that *Glo-wormes* in *Glasses* were put in the *Water*, to make the *Fish* come. But I am not yet informed, whether when a *Diver* Diveth, having his *Eyes* open, and swimmeth upon his

Backe;

Backe; whether (I say) he seeth *Things* in the *Aire* greater, or lesse. For it is manifest, that when the *Eye* standeth in the *Finer Medium*, and the *Object* is in the *Grosser*, things shew greater; But contrariwise, when the *Eye* is placed in the *Grosser Medium*, and the *Object* in the *Finer*, how it worketh I know not.

It would be well boulded out, whether great *Refractions* may not be made upon *Reflexions*, as well as upon *Direct Beames*. For Example, We see that take an *Emptie Basen*, put an *Angell* of *Gold*, or what you will, into it; Then goe so farre from the *Basen*, till you cannot see the *Angell*, because it is not in a *Right Line*; Then fill the *Basen* with *Water*, and you shall see it out of his Place, because of the *Reflexion*. To proceed therefore, put a *Looking-Glasse* into a *Basen* of *Water*; I suppose you shall not see the *Image* in a *Right Line*, or at equall *Angles*, but aside. I know not, whether this *Experiment* may not be extended so, as you might see the *Image*, and not the *Glasse*; Which for *Beautie*, and *Strangenesse*, were a fine *Prooffe*: For then you should see the *Image* like a *Spirit* in the *Aire*. As for Example, If there be a *Cesterne* or *Poole* of *Water*, you shall place over against it a *Picture* of the *Devill*, or what you will, so as you doe not see the *Water*. Then put a *Looking-Glasse* in the *Water*: Now if you can see the *Devills Picture* aside, not seeing the *Water*, it will looke like a *Devill* indeed. They have an old tale in *Oxford*, that *Friar Bacon* walked betweene two *Steeles*: Which was thought to be done by *Glasses*, when he walked upon the *Ground*.

762

A *Weightie Body* put into *Motion*, is more easily impelled, than at first when it *Resteth*. The *Cause* is, Partly because *Motion* doth discusse the *Tarpour* of *Solide Bodies*; Which beside their *Motion* of *Gravitie*, have in them a *Naturall Appetite*, not to move at all; And partly, because a *Body* that *resteth*, doth get, by the *Resistance* of the *Body* upon which it *resteth*, a stronger *Compression* of *Parts*, than it hath of it *Selfe*: And therefore needeth more *Force* to be put in *Motion*. For if a *Weightie Body* be *Penfile*, and hang but by a *Thred*, the *Percussion* will make an *Impulsion* verie neare as easily, as if it were already in *Motion*.

A *Body* *Over-great*, or *Over-small*, will not be throwne so farre, as a *Body* of a *Middle Size*: So that (it seemeth) there must be a *Commensuration*, or *Proportion*, betweene the *Body Moved*, and the *Force*, to make it move well. The *Cause* is, because to the *Impulsion*, there is requisite the *Force* of the *Body* that *Moveth*, and the *Resistance* of the *Body* that is *Moved*: And if the *Body* be too great, it yeeldeth too little; And if it be too small, it resisteth too little.

It is *Common Experience*, that no *Weight* will presse or cut so strong, being laid upon a *Body*, as *Falling*, or *strucken* from above. It may be the *Aire* hath some part in furthering the *Percussion*: But the chiefe *Cause* I take to be, for that the *Parts* of the *Body Moved*, have by *Impulsion*, or by the *Motion* of *Gravitie* continued, a *Compression* in them, as well downwards, as they have when they are throwne, or *Shot* thorow the *Aire*, forwards.

Experiments
in Confort
touching
Impulsion, and
Percussion.

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forwards. I conceive also, that the quicke *Loose* of that *Motion*, preventeth the *Resistance* of the *Body* below; And *Prioritie* of the *Force*, (alwayes,) is of great *Efficacie*; As appeareth in infinite *Instances*.

Experiment
Solitary, touching
Titillation.

766

Tickling is most in the *Soles* of the *Feet*, and under the *Arme-Holes*, and on the *Sides*. The *Cause* is, the *Thinness* of the *Skin* in those *Parts*; Ioyned with the *Rareness* of being touched there. For all *Tickling* is a light *Motion* of the *Spirits*, which the *Thinness* of the *Skin*, and *Suddenness*, and *Rareness* of *Touch*, doe further: For we see, a *Feather*, or a *Rush*, drawne along the *Lip*, or *Cheeke*, doth tickle; Whereas a *Thing* more *Obtuse*, or a *Touch* more *Hard*, doth not. And for *Suddenness*; We see no *Man* can tickle himselfe: We see also, that the *Palme* of the *Hand*, though it hath as *Thin* a *Skin*, as the other *Parts* Mentioned, yet is not *Ticklish*, because it is accustomed to be *Touched*. *Tickling* also causeth *Laughter*. The *Cause* may be, the *Emission* of the *Spirits*, and so of the *Breath*, by a *Flight* from *Titillation*; For upon *Tickling*, wee see there is ever a *Starting*, or *Shrinking* away of the *Part*, to avoid it; And we see also, that if you *Tickle* the *Nostrills*, with a *Feather*, or *Straw*, it procureth *Sneezing*; Which is a *Sudden Emission* of the *Spirits*, that doe likewise expell the *Moisture*. And *Tickling* is ever *Painfull*, and not well endured.

Experiment
Solitary, touching the
Scar-citie of Raine in
Egypt.

767

IT is strange, that the *River* of *Nilus*, Over-flowing, as it doth, the *Countrey* of *Egypt*, there should be neverthelesse little or no *Raine* in that *Countrey*. The *Cause* must be, Either in the *Nature* of the *Water*; Or in the *Nature* of the *Aire*; Or of Both. In the *Water*, it may be ascribed, either unto the *Long Race* of the *Water*: For *Swift Running Waters* vapour not so much as *Standing Waters*; Or else to the *Concoction* of the *Water*; For *Waters* well *Concocted* vapour not so much, as *Waters Raw*; No more than *Waters* upon the *Fire* doe vapour so much, after some time of *Boyling*, as at the first. And it is true, that the *Water* of *Nilus* is sweeter than other *Waters* in *Taste*; And it is excellent *Good* for the *Stone*, and *Hypochondriacall Melancholy*; Which sheweth it is *Lenefying*: And it runneth thorow a *Countrey* of a *Hot Climate*, and flat, without *Shade*, either of *woods*, or *Hills*; Whereby the *Sunne* must needs have great *Power* to *Concoct* it. As for the *Aire*, (from whence I conceive this *Want* of *Showers* commeth chiefly;) The *Cause* must be, for that the *Aire* is, of it selfe, *Thin* and *Thirstie*; And as soone as ever it getteth any *Moisture* from the *Water*, it imbibeth, and dissipateth it, in the whole body of the *Aire*; And suffereth it not to remaine in *Vapour*; Whereby it might breed *Raine*.

Experiment
Solitary, touching
Clarification.

768

IT hath beene touched in the *Title* of *Percolations*, (Namely such as are *Inwards*;) that the *Whites* of *Eggs*, and *Milke*, doe *clarifie*; And it is certaine, that in *Egypt*, they prepare and *clarifie* the *Water* of *Nile*, by putting it into great *Jarres* of *Stone*, and *Stirring* it about with a few

Stamped

Stamped *Almonds*; Wherewith they also besmeare the Mouth of the *Vessell*; And so draw it off, after it hath rested some time. It were good, to trie this *Clarifying* with *Almonds*, in *New Beere*, or *Must*, to hasten, and perfect the *Clarifying*.

There be scarce to be found any *Vegetables*, that have *Branches*, and no *Leaves*; except you allow *Corall* for one. But there is also in the *Desarts* of *S. Macario* in *Agypt*, a *Plant* which is Long, Leavelesse, Browne of Colour, and Branched like *Corall*, save that it closeth at the *Top*. This being set in *Water* within *House*, spreadeth and displayeth strangely; And the People thereabouts have a Superstitious Beleeve, that in the *Labour* of *Women*, it helpeth to the *Easie Deliverance*.

Experiment
Solitary, touching
Plants
without
Leaves.

769

The *CrySTALLINE Venice Glasse*, is reported to be a Mixture, in equal Portions, of *Stones*, brought from *Pavia*, by the *River Ticinum*; And the *Ashes* of a *Weed* called by the *Arabs Kall*, which is gathered in a *Desart* betweene *Alexandria* and *Rosetta*; And is by the *Egyptians* used first for *Fuell*; And then they crush the *Ashes* into Lumps, like a *Stone*; And so sell them to the *Venetians* for their *Glasse-works*.

Experiment
Solitary, touching the
Materials of
Glasse.

770

It is strange, and well to be noted, how long *Carkasses* have continued *Uncorrupt*, and in their former *Dimensions*; As appeareth in the *Mummies* of *Agypt*; Having lasted, as is conceived, (some of them,) three thousand yeares. It is true, they finde Meanes to draw forth the *Brains*, and to take forth the *Entrails*, which are the *Parts* aptest to corrupt. But that is nothing to the Wonder: For we see, what a Soft and Corruptible *Substance* the *Flesh*, of all the other *Parts* of the *Body*, is. But it should seeme, that according to our *Observation*, and *Axiome*, in our hundredth *Experiment*, *Putrefaction*, which wee conceive to be so *Naturall* a *Period* of *Bodies*, is but an *Accident*; And that *Matter* maketh not that *Haste* to *Corruption*, that is conceived. And therefore *Bodies*, in *Shining-Amber*; In *Quicke-Silver*; In *Balmes*, (whereof wee now speake;) In *Wax*; In *Honey*; In *Gummes*; And (it may be) in *Conservatories* of *Snow*; &c. are preserved verie long. It need not goe for *Repetition*, if we resume againe that which wee said in the aforesaid *Experiment*, concerning *Annihilation*; Namely, that if you provide against three *Causes* of *Putrefaction*, *Bodies* will not corrupt: The First is, that the *Aire* be excluded; For that undermineth the *Body*, and conspireth with the *Spirit* of the *Body* to dissolve it. The Second is, that the *Body* *Adjacent* and *Ambient* be not *Commateriall*, but meerely *Heterogeneall* towards the *Body* that is to be preserved: For if nothing can be received by the One, Nothing can issue from the Other; Such are *Quick-Silver*, and *White-Amber*, to *Herbs*, & *Flies*, and such *Bodies*. The Third is, that the *Body* to be preserved, be not of that *Grosse*, that it may corrupt within it selfe, although no *Part* of it issue into the *Body* *Adjacent*: And therefore it must be rather *Thin*, and *small*, than of *Bulke*. There is a Fourth *Remedie* also, which is; That

Experiment
Solitary, touching
Prohibition of
Putrefaction, and the
Long Conservation
of Bodies.

771

That if the *Body* to be preserved be of *Bulke*, as a *Corps* is, then the *Body* that incloseth it, must have a Vertue to draw forth, and drie the *Moisture* of the *Inward Body*; For else the *Putrefaction* will play within, though Nothing issue forth. I remember *Livy* doth relate, that there were found, at a time, two *Coffins* of *Lead*, in a *Tombe*; Whereof the one contained the *Body* of *King Numa*; It being some foure hundred yeares after his Death: And the other, his *Bookes* of *Sacred Rites* and *Ceremonies*, and the *Discipline* of the *Pontifes*; And that in the *Coffin* that had the *Body*, there was Nothing (at all) to be seene, but a little light *Cinders* about the *Sides*; But in the *Coffin* that had the *Bookes*, they were found as fresh, as if they had been but newly *Written*; being written in *Parchment*, and couered over with *Watch-Candles* of *Wax*, three or foure fold. By this it seemeth, that the *Romans*, in *Numa's* time, were not so good *Embalmers*, as the *Egyptians* were; Which was the *Cause* that the *Body* was utterly consumed. But I finde in *Plutarch*, and Others, that when *Augustus Caesar* visited the *Sepulchre* of *Alexander the Great*, in *Alexandria*, he found the *Body* to keepe his *Dimension*; But withall, that, notwithstanding all the *Embalming*, (which no doubt was of the best,) the *Body* was so Tender, as *Caesar* touching but the *Nose* of it, defaced it. Which maketh mee finde it very strange, that the *Egyptian Mummies* should be reported to be as Hard as *Stone-Pitch*: For I finde no difference but one; Which indeed may be very *Materiall*; Namely, that the *Ancient Egyptian Mummies*, were shrowded in a Number of Folds of *Linnen*, besmeared with *Gums*, in manner of *Seare-Cloth*; Which it doth not appeare was practised upon the *Body* of *Alexander*.

Experiment
Solitary, touching the
Abundance of Nitre in certaine
Sea-Shoares.

772

Experiment
Solitary, touching Bodies
that are borne
up by Water.

773

Experiment
Solitary, touching Fuell,
that consumeth
little, or nothing.

774

NEare the *Castle* of *Catie*, and by the *Wells* of *Affan*, in the *Land* of *Idumea*, a great Part of the *Way*, you would thinke the *Sea* were neare hand, though it be a good distance off: And it is Nothing, but the *Shining* of the *Nitre*, upon the *Sea-Sands*; Such *Abundance* of *Nitre* the *Shores* there doe put forth.

THE *Dead-Sea*, which vomiteth up *Bitumen*, is of that *Crafftitude*, as *Living Bodies* bound Hand and Foot, cast into it, have beene borne up, and not sunke. Which sheweth, that all *Sinking* into *Water*, is but an *Over-weight* of the *Body*, put into the *Water*, in respect of the *Water*: So that you may make *Water* so strong, and heauy, of *Quicke-Silver*, (perhaps,) or the like, as may beare up *Iron*: Of which I see no Use, but *Imposture*. Wee see also, that all *Metalls*, except *Gold*, for the same reason, swimme upon *Quicke-Silver*.

IT is reported, that at the *Foot* of a *Hill*, neare the *Mare mortuum*, there is a *Blacke Stone*, (whereof *Pilgrims* make *Fires*.) which burneth like a *Coale*, and diminisheth not; But onely waxeth *Brighter*, and *Whiter*. That it should doe so, is not strange; For we see *Iron Red Hot* burneth, and consumeth not: But the *Strangenesse* is, that it should continue any
time

time so: For *Iron*, as soone as it is out of the Fire, deadeth straight-waies. Certainly, it were a Thing of great Use, and Profit, if you could finde out *Fuell*, that would burne Hot, and yet last long: Neither am I altogether Incredulous, but there may be such *Candles*, as they say are made of *Salamanders Wooll*; Being a Kinde of *Minerall*, which whiteneth also in the Burning, and consumeth not. The Question is this; *Flame* must be made of somewhat; And commonly it is made of some *Tangible Body*, which hath *weight*: But it is not impossible, perhaps, that it should be made of *Spirit*, or *Vapour*, in a *Body*; (which *Spirit* or *Vapour* hath no *Weight*;) such as is the Matter of *Ignis Fatuus*. But then you will say, that that *Vapour* also can last but a short time: To that it may be answered, That by the helpe of *Oile*, and *Wax*, and other *Candle-Stuffe*, the *Flame* may continue, and the *Wicke* not burne.

Sea-Coale last longer than *Char-Coale*; And *Char-coale* of *Roots*, being scoaled into great Peeces, last longer than Ordinary *Char-Coale*. *Turse*, and *Peat*, and *Cow-Sheards*, are cheape *Fuels*, and last long. *Small-Coale*, or *Briar-Coale*, powred upon *Char-Coale*, make them last longer. *Sedge* is a cheape *Fuell* to Brew, or Bake with; the rather because it is good for Nothing else. Triall would be made of some Mixture of *Sea-Coale* with *Earth*, or *Chalke*; For if that Mixture be, as the *Sea-Coale-Men* use it, privily, to make the Bulke of the *Coale* greater, it is Deceit; But if it be used purposely, and be made knowne, it is Saving.

IT is, at this Day, in use, in *Gaza*, to couch *Pot-Sheards* or *Vessels* of *Earth*, in their *Walls*, to gather the *Wind* from the Top, and to passe it downe in Spouts into *Roomes*. It is a Device for *Freshnesse*, in great Hears: And it is said, there are some *Roomes* in *Italie*, and *Spaine*, for *Freshnesse*, and Gathering the *Winds*, and *Aire*, in the *Heats* of *Summer*. But they be but *Pennings* of the *Winds*, and *Enlarging* them againe, and *Making* them *Reverberate*, and goe Round in *Circles*, rather than this Device of *Spouts* in the wall.

There would be used much diligence, in the Choice of some *Bodies*, and *Places*, (as it were,) for the *Tasting* of *Aire*; to discover the *wholesomenesse* or *Unwholesomenesse*, as well of *Seasons*, as of the *Seats* of *Dwellings*. It is certaine, that there be some *Houses*, wherein *Confitures*, and *Pies*, will gather *Mould*, more than in Others. And I am perswaded, that a *Peece* of *Raw Flesh*, or *Fish*, will sooner corrupt in some *Aires*, than in Others. They be noble *Experiments*, that can make this *Discoverie*; For they serve for a *Naturall Divination* of *Seasons*; Better than the *Astronomers* can by their *Figures*: And againe, they teach *Men* where to chuse their *Dwelling*, for their better *Health*.

There is a Kinde of *Stone*, about *Bethleem*, which they grinde to *Powder*, and put into *Water*, whereof *Cattell* drinke; Which maketh them

Experiment
Solitary, touching
economicall
touching cheape
Fuell.

775

Experiment
Solitary, touching
the Gathering of
Wind for Freshnesse.

776

Experiment
Solitary, touching
the Trials of
Aires.

777

Experiment
Solitary, touching
increasing

give

Exp^{iment}
Solitary, tou-
ching Sand of
the Nature of
Glasfe.

778

give more Milke. Surely, there would be some better Trialls made of *Mixture of Water in Ponds for Cattle*, to make them more Milke; Or to *Keep them from Murraine*. It may be, *Ghalke*, and *Nitre*, are of the best.

Exp^{iment}
Solitary, tou-
ching Sand of
the Nature of
Glasfe.

779

It is reported, that in the *Valley* neare the *Mountain Carmel*, in *Iudea*, there is a Sand, which, of all other, hath most Affinitie with Glasfe; Inasmuch as other Minerals, laid in it, turne to a Glasie Substance, without the Fire. And againe Glasfe put into it, turneth into the Mother-Sand. The Thing is very strange, if it be true: And it is likeliest to be Caused by some *Naturall Farnace*, or Heat in the Earth: And yet they doe not speake of any Eruption of Flames. It were good to trie in Glasfe-Workes, whether the Crude Materialls of Glasfe, mingled with Glasfe already made and Re-moulten, doe not facilitate the Making of Glasfe with lesse Heat.

Exp^{iment}
Solitary, tou-
ching the
Growth of
Corall.

780

In the Sea, upon the South-west of *Sicilie*, much *Corall* is found. It is a *Sub-Marine Plant*. It hath no Leaves: It brancheth onely when it is under Water; It is Soft, and Greene of Colour; But being brought into the Aire, it becommeth Hard, and Shining Red, as we see. It is said also, to have a *White Berry*; But we finde it not brought over with the *Corall*. Belike it is cast away as nothing worth: Inquire better of it, for the Discoverie of the Nature of the Plant.

Exp^{iment}
Solitary, tou-
ching the Ga-
thering of Man-
na.

781

The *Manna of Calabria* is the best, and in most Plenty. They gather it from the *Leafe* of the *Mulberry Tree*; But not of such *Mulberry Trees*, as grow in the *Valley's*. And *Manna* falleth upon the *Leaves* by Night, as other *Deames* doe. It should seeme, that before those *Deames* come upon *Trees* in the *Valley's*, they dissipate, and cannot hold out. It should seeme also, the *Mulberry-Leafe*, it selfe, hath some Coagulating Vertue, which inspissateth the *Deaw*, for that it is not found upon other *Trees*: And we see by the *Silke-Worme*, which feedeth upon that *Leafe*, what a Dainty Smooth Iuyce it hath; And the *Leaves* also, (especiallly of the *Blacke Mulberry*,) are somewhat Bristly, which may helpe to preserve the *Deaw*. Certainly, it were not amisse, to observe a little better, the *Deames* that fall upon *Trees*, or *Herbs*, Growing on *Mountaines*; For, it may be, many *Deames* fall, that spend before they come to the *Valleys*. And I suppose, that he that would gather the best *May-Deaw* for Medicine, should gather it from the *Hills*.

Exp^{iment}
Solitary, tou-
ching the Cor-
recting of Wine.

782

It is said, they have a manner, to prepare their *Greeke-Wines*, to keepe them from Fuming, and Inebriating, by adding some *Sulphur*, or *Al-lome*: Whereof the one is *Vnctuous*, and the other is *Astringent*. And certaine it is, that those two *Natures* doe best repress *Fumes*. This Experiment would be transferred, unto other *wine*, and *Strong Beere*, by Putting in some like *Substances*, while they worke; Which may make them both to *Fume* lesse, and to *Inflame* lesse.

It

IT is conceived by some, (not improbably,) that the reason, why *Wilde-Fires*, (Whereof the principall Ingredient is *Bitumen*,) doe not quench with *Water*, is, for that the first Concretion of *Bitumen* is a *Mixture*, of a *Fiery*, and *Watry Substance*: So is not *Sulphur*. This appeareth, for that in the *Place* neare *Puteoli*, which they call the *Court of Vulcan*, you shall heare, under the *Earth*, a Horrible Thundring of *Fire*, and *Water*, conflicting together: And there breake forth also *Spouts* of *Boyling Water*. Now that *Place* yeeldeth great *Quantities* of *Bitumen*; Whereas *Etna*, and *Vesuvius*, and the like, which consist upon *Sulphur*, shoot forth *Smoake*, and *Asbes*, and *Pumice*, but no *Water*. It is reported also, that *Bitumen* Mingled with *Lime*, and Put under *Water*, will make, as it were, an *Artificiall Rocke*; The *Substance* becommeth so Hard.

Experiment
Solitary, touch-
ing the Ma-
terialls of Wild-
Fire.

783

THere is a *Cement*, compounded of *Flower*, *Whites* of *Egges*, and *Stone* powdered, that becommeth Hard as *Marble*; wherewith *Piscina mirabilis*, neare *Cuma*, is said to have the *Walls* Plastered. And it is certaine, and tried, that the *Powder* of *Load-Stone*, and *Flint*, by the Addition of *Whites* of *Egges*, and *Gumm-Dragon*, made into *Paste*, will in a few dayes harden to the Hardnesse of a *Stone*.

Experiment
Solitary, touch-
ing *Plaster*
growing as
Hard as *Mar-*
ble.

784

IT hath beene noted by the *Ancients*, that in *Full* or *Impure Bodies*, *Vlcers* or *Hurts* in the *Leggs*, are Hard to Cure; And in the *Head* more Easie. The *Cause* is, for that *Vlcers* or *Hurts* in the *Leggs* require *Desiccation*, which by the *Defluxion* of *Humours* to the *Lower Parts* is hindred; Whereas *Hurts* and *Vlcers* in the *Head* require it not; But contrariwise *Driness* maketh them more apt to Consolidate. And in *Moderne Observation*, the like difference hath beene found, betweene *French-Men*, and *English-men*; Whereof the ones *Constitution* is more *Dry*, and the others more *Moist*. And therefore a *Hurt* of the *Head* is harder to cure in a *French-Man*, and of the *Legge* in an *English-Man*.

Experiment
Solitary, touch-
ing *Judge-*
ment of the
Cure in some
Vlcers and
Hurts.

785

IT hath beene noted by the *Ancients*, that *Southerne Winds*, blowing much, without *Raine*, doe cause a *Fevourous Disposition* of the *Yeare*; But with *Raine*, not. The *Cause* is, for that *Southerne Winds* doe, of themselves, qualifie the *Aire*, to be apt to cause *Fevers*; But when *Showers* are joyned, they doe Refrigerate in Part, and Checke the Sultry Heat of the *Southerne Wind*. Therefore this holdeth not in the *Sea-Coasts*, because the *Vapour* of the *Sea*, without *Showers*, doth refresh.

Experiment
Solitary, touch-
ing the
Healthfulnesse
or *Unhealthful-*
nesse of the *Sou-*
therne Wind.

786

IT hath beene noted by the *Ancients*, that *wounds* which are made with *Brasse*, heale more easily, than *wounds* made with *Iron*. The *Cause* is, for that *Brasse* hath, in it selfe, a *Sanative Vertue*; And so in the very *Instant* helpeth somewhat: But *Iron* is *Corrosive*, and not *Sanative*. And therefore it were good, that the *Instruments* which are used by *Chirurgians* about *Wounds*, were rather of *Brasse*, than *Iron*.

Experiment
Solitary, touch-
ing *Wounds*.

787

Experiment
Solitary, touch-
ing Mortifi-
cation by Cold.

788

887

IN the *Cold Countries*, when Mens *Noses*, and *Eares* are Mortified, and (as it were) Gangrened with *Cold*, if they come to a *Fire*, they rot off presently. The *Cause* is, for that the few *Spirits*, that remaine in those *Parts*, are suddenly drawne forth, and so *Putrefaction* is made Compleat. But *snow* Put upon them, helpeth; For that it preserveth those *Spirits* that remaine, till they can revive; And besides, *snow* hath in it a Secret *Warmth*: As the *Monke* proved out of the *Text*; *Qui dat Nivem sicut Lavanam, Gelu sicut Cineres spargit*. Whereby he did inferre, that *snow* did warme like *Woolle*, and *Frost* did fret like *Ashes*. *Warne Water* also doth good; Because by little and little it openeth the *Pores*, without any sudden Working upon the *Spirits*. This *Experiment* may be transferred unto the *Cure* of *Gangrenes*, either Comming of themselves, or induced by too much Applying of *Opiates*: Wherein you must beware of *Dry Heat*, and resort to Things that are *Refrigerant*, with an Inward *Warmth*, and *Vertue* of Cherishing.

Experiment
Solitary, touch-
ing Weight.

789

WEigh *Iron*, and *Aqua Fortis*, severally; Then dissolve the *Iron* in the *Aqua Fortis*; And weigh the *Dissolution*; And you shall finde it to beare as good *Weight*, as the *Bodies* did severally: Notwithstanding a good deale of *Wast*, by a thick *Vapour*, that issueth during the *Working*: Which sheweth, that the *Opening* of a *Body*, doth increase the *Weight*. This was tried once, or twice, but I know not, whether there were any *Error*; in the *Triall*.

Experiment
Solitary, touch-
ing the Super-
Natation of
Bodies.

790

TAKE of *Aqua-Fortis* two Ounces, of *Quick-silver* two Drachmes, (For that Charge the *Aqua-Fortis* will beare;) The *Dissolution* will not beare a *Flint*, as big as a *Nutmeg*: Yet (no doubt) the Increasing of the *Weight* of *Water*, will increase his *Power* of *Bearing*; As we see *Broine*, when it is Salt enough, will beare an *EGge*. And I remember well a *Physician*, that used to give some *Minerall Baths* for the *Gout*, &c. And the *Body* when it was put into the *Bath*, could not get downe so easily, as in *Ordinary Water*. But it seemeth, the *Weight* of the *Quick-silver*, more than the *Weight* of a *Stone*; doth not compensate the *Weight* of a *Stone*, more than the *Weight* of the *Aqua-Fortis*.

Experiment
Solitary, touch-
ing the Fly-
ing of Unequall
Bodies in the
Aire.

791

887

LET there be a *Body* of *Unequall weight*; (As of *wood* and *Lead*, or *Bone* and *Lead*;) If you throw it from you with the *Light-End* forward, it will turne, and the *Weightier End* will recover to be Forwards; Unlessse the *Body* be Over-long. The *Cause* is, for that the more *Dense Body*, hath a more *Violent Pressure* of the *Parts*, from the first *Impulsion*; Which is the *Cause*, (though heretofore not found out, as hath bin often said) of all *Violent Motions*: And when the *Hinder Part* moveth swifter, (for that it lesse endureth *Pressure* of *Parts*;) than the *Forward Part* can make way for it, it must needs be, that the *Body* turne over: For (turned) it can more easily draw forward the *Lighter Part*. *Galileum* noteth it well; That if an *Open Trough*, wherein *Water* is, be driven faster than the *Water* can

can follow, the *water* gathereth upon an heape, towards the *Hinder End*, where the *Motion* began; Which he supposeth, (holding confidently the *Motion* of the *Earth*;) to be the *Cause* of the *Ebbing* and *Flowing* of the *Ocean*; Because the *Earth* over-runneeth the *water*. Which *Theory*, though it be false, yet the first *Experiment* is true. As for the *Inequality* of the *Pressure* of *Parts*, it appeareth manifestly in this; That if you take a *Body* of *Stone*, or *Iron*, and another of *Wood*, of the same *Magnitude*, and *Shape*, and throw them with equall *Force*, you cannot possibly throw the *Wood*, so farre, as the *Stone*, or *Iron*.

IT is certaine, (as it hath beene formerly, in part, touched,) that *Water* may be the *Medium* of *Sounds*. If you dash a *Stone* against a *Stone* in the *Bottom* of the *Water*, it maketh a *Sound*. So a long *Pole* stricke upon *Gravell*, in the *Bottom* of the *Water*, maketh a *Sound*. Nay, if you should thinke that the *Sound* commeth up by the *Pole*, and not by the *Water*, you shall finde that an *Anchor*, let downe by a *Rope*, maketh a *Sound*; And yet the *Rope* is no *Solide Body*, whereby the *Sound* can ascend.

ALL *Objects* of the *Senses*, which are very *Offensive*, doe cause the *Spirits* to retire; And upon their *Flight*, the *Parts* are (in some degree) destitute; And so there is induced in them a *Trepidation* and *Horror*. For *Sounds*, we see that the *Grating* of a *Saw*, or any very *Harsh Noise*, will set the *Teeth* on edge, and make all the *Body* Shiver. For *Tastes*, we see that in the Taking of a *Potion*, or *Pills*, the *Head*, and the *Necke* shake. For *Odious Smells*, the like Effect followeth, which is lesse perceived, because there is a *Remedy* at hand, by *Stopping* of the *Nose*: But in *Horses*, that can use no such *Helpe*, we see the *Smell* of a *Carrion*, especially of a *Dead Horse*, maketh them fly away, and take on, almost as if they were *Mad*. For *Feeling*, if you come out of the *Sunne*, suddenly, into a *Shade*, there followeth a *Chilnesse* or *Shivering* in all the *Body*. And even in *Sight*, which hath (in effect) no *Odious Object*, Comming into *Sudden Darknesse*, induceth an offer to *Shiver*.

THere is, in the *City* of *Ticinum*, in *Italy*, a *Church*, that hath *Windows* only from above: It is in *Length* an *Hundred Feet*, in *Breadth* *Twenty Feet*, and in *Height* neare *Fifty*; Having a *Doore* in the *Middest*. It reporteth the *Voice*, twelve or thirteene times, if you stand by the *Close End-wall*, over against the *Doore*. The *Eccho* fadeth, and dyeth by little and little, as the *Eccho* at *Pont-charenton* doth. And the *Voice* soundeth, as if it came from above the *Doore*. And if you stand at the *Lower End*, or on either *Side* of the *Doore*, the *Eccho* holdeth; But if you stand in the *Doore*, or in the *Middest* just over against the *Doore*, not. Note that all *Eccho's* sound better against *Old walls*, than *New*; Because they are more *Dry*, and *Hollow*.

Experiment
Solitary, touching
Water, that it may be
the Medium of
Sounds.

792

Experiment
Solitary, of the
Flight of the
Spirits upon O-
dious Objects.

793

Experiment
Solitary, touch-
ing the Su-
per-Reflexion
of Eccho's.

794

Experiment
Solitary, tou-
ching the Force
of Imagination,
Imitating that
of the Sense.

795

THose Effects, which are wrought by the *Percussion* of the *Sense*, and by *Things in Fact*, are produced likewise, in some degree, by the *Imagination*. Therefore if a Man see another eat *Soure* or *Acide Things*, which set the *Teeth* on edge, this *Object* tainteth the *Imagination*. So that he that seeth the *Thing* done by another, hath his owne *Teeth* also set on edge. So if a Man see another turne swiftly, and long; Or if he looke upon *Wheeles* that turne, Himselfe waxeth *Turne-sicke*. So if a Man be upon an *High Place*, without *Railes*, or good Hold, except he be used to it, he is Ready to Fall: For *Imagining a Fall*, it putteth his *Spirits* into the very *Action* of a *Fall*. So Many upon the *Seeing* of others *Bled*, or *Strangled*, or *Tortured*, Themselves are ready to faint, as if they *Bled*, or were in *Strife*.

Experiment
Solitary, tou-
ching Preserva-
tion of Bodies.

796

TAke a *Stoeke-Gilly-Flower*, and tye it gently upon a *Sticke*, and put them both into a *Scoope Glasse*, full of *Quick-silver*, so that the *Flower* be covered: Then lay a little *Weight* upon the *Top* of the *Glasse*, that may keepe the *Sticke* downe; And looke upon them after foure or five dayes; And you shall finde the *Flower* Fresh, and the *Stalke* Harder, and lesse *Flexible*, than it was. If you compare it with another *Flower*, gathered at the same time, it will be the more manifest. This sheweth, that *Bodies* doe preserve excellently in *Quick-silver*; And not preserve onely, but, by the *Coldnesse* of the *Quick-silver*, *Indurate*; For the *Freshnesse* of the *Flower* may be meere *Conservation*; (which is the more to be observed, because the *Quick-silver* presseth the *Flower*;) But the *Stiffenesse* of the *Stalke*, cannot be without *Induration*, from the *Cold* (as it seemeth,) of the *Quick-silver*.

Experiment
Solitary, tou-
ching the
Growth, or
Multiplying of
Metalls.

797

IT is reported by some of the *Ancients*, that in *Cyprus*, there is a *Kinde* of *Iron*, that being cut into *Little Peeces*, and put into the *Ground*, if it be well *Watered*, will increase into *Greater Peeces*. This is certaine, and knowne of *Old*; That *Lead* will multiply, and Increase; As hath beene seene in *Old Statues* of *Stone*, which have beene put in *Cellars*; The *Feet* of them being bound with *Leaden Bands*; Where (after a time,) there appeared, that the *Lead* did swell; Insomuch as it hanged upon the *Stone* like *Warts*.

Experiment
Solitary, tou-
ching the
Drowning of
the more Base
Metall in the
more Precious.

798

ICall *Drowning of Metalls*, when that the *Baser Metall*, is so incorporate with the more *Rich*, as it can by no *Meanes* be separated againe: which is a kinde of *Version*, though *False*: As if *Silver* should be inseparably incorporated with *Gold*; Or *Copper*, and *Lead*, with *Silver*. The *Ancient Electrum* had in it a *Fifth* of *Silver* to the *Gold*; And made a *Compound Metall*, as fit for most uses, as *Gold*; And more *Resplendent*, and more *Qualified* in some other *Properties*; But then that was easily *Separated*. This to doe priuily, or to make the *Compound* passe for the *Rich Metall* Simple, is an *Adulteration*, or *Counterfeiting*: But if it be done *Avowedly*, and without *Disguizing*, it may be a great *Saving* of the

the *Richer Metall*. I remember to have heard of a Man, skilfull in *Metalls*, that a Fifteenth Part of *Silver*, incorporate with *Gold*, will not be Recovered by any *water of Separation*; Except you put a Greater *Quantitie* of *Silver*, to draw to it the *Lesse*; which (he said) is the last Refuge in *Separations*. But that is a tedious way, which no Man (almost) will thinke on. This would be better enquired; And the *Quantitie* of the Fifteenth turned to a Twentieth; And likewise with some little *Additionall*, that may further the *Intrinsique Incorporation*. Note that *Silver* in *Gold* will be detected by *Weight*, compared with the *Dimension*; But *Lead* in *Silver*, (*Lead* being the *Weightier Metall*,) will not be detected; If you take so much the more *Silver*, as will countervaille the *Over-weight* of the *Lead*.

Gold is the onely *Substance*, which hath nothing in it *Volatile*, and yet smelteth without much difficultie. The *Melting* sheweth that it is not Jeune, or Scarce in *Spirit*. So that the *Fixing* of it, is not *Want* of *Spirit* to fly out, but the *Equall Spreading* of the *Tangible Parts*, and the *Close Coacervation* of them: Whereby they have the lesse Appetite, and no Meanes (at all) to issue forth. It were good therefore to try, whether *Glasse Re-moulten* doe leese any *Weight*? For the *Parts* in *Glasse* are evenly Spred; But they are not so Close as in *Gold*; As we see by the Easie Admission of *Light*, *Heat*, and *Cold*; And by the *Smalnesse* of the *Weight*. There be other *Bodies*, *Fixed*, which have little, or no *Spirit*: So as there is nothing to fly out; As we see in the *Stuffe*, whereof *Coppells* are made; Which they put into *Furnaces*; Upon which *Fire* worketh not: So that there are three *Causes of Fixation*; The *Even Spreading* both of the *Spirits*, and *Tangible Parts*; The *Closenesse* of the *Tangible Parts*; And the *Leinenesse* or *Extreme Comminution* of *Spirits*: Of which Three, the Two First may be ioyned with a *Nature Liquefiable*; The Last not.

Experiment
Solitary, touching
Fixation
of Bodies.

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IT is a Profound *Contemplation* in *Nature*, to consider of the *Emptiness*, (as we may call it,) or *Insatisfaction* of severall *Bodies*; And of their Appetite to take in Others. *Aire* taketh in *Lights*, and *Sounds*, and *Smells*, and *Vapours*; And it is most manifest, that it doth it, with a kinde of Thirst, as not satisfied with his owne former Consistence; For else it would never receive them in so suddenly, and easily. *Water*, and all *Liquours*, doe hastily receive *Dry* and more *Terrestriall Bodies*, Proportionable: And *Dry Bodies*, on the other side, drinke in *Waters*, and *Liquours*: So that, (as it was well said, by one of the *Ancients*, of *Earthy* and *Watry Substances*,) One is a *Glue* to another. *Parchment*, *Skins*, *Cloth*, &c. drinke in *Liquours*, though themselves be *Entire Bodies*, and not *Comminuted*, as *Sand*, and *Asbes*; Nor apparently Porous: *Metalls* themselves doe receive in readily *Strong-Waters*; And *Strong-Waters* likewise doe readily pierce into *Metalls*, and *Stones*: And that *Strong-Water* will touch upon *Gold*, that will not touch upon *Silver*; And *converso*. And *Gold*, which

Experiment
Solitary, touching
the *Rest-
lesse Nature* of
Things in
Themselves, and
their Desire to
change.

800

which seemeth by the *Weight*, to be the Closest, and most Solide *Body*, doth greedily drinke in *Quick-Silver*. And it seemeth, that this *Reception* of other *Bodies*, is not Violent: For it is (many times) Reciprocall, and as it were with Consent. Of the *Cause* of this, and to what *Axiome* it may be referred, consider attentively; For as for the Pretty Assertion, that *Matter* is like a *Common Strumpet*, that desireth all *Formes*, it is but a *Wandering Nozion*. Onely *Flame* doth not content it selfe to take in any other *Body*; But either, to overcome and turne another *Body* into it Selfe, as by *Victory*; Or it Selfe to dye, and goe out.

NATU



NATVRALL HISTORIE.

I X. Century.



It is certaine, that all *Bodies* whatsoever, though they have no *Sense*, yet they have *Perception*: For when one *Body* is applied to another, there is a *Kinde of Election*, to embrace that which is Agreeable, and to exclude or expell that which is Ingrate: And whether the *Body* be *Alterant*, or *Altered*, evermore a *Perception* precedeth *Operation*: For else all *Bodies* would be alike One to Another. And sometimes this *Perception*, in some *Kinde of Bodies*, is farre more Subtill than the *Sense*; So that the *Sense* is but a dull Thing in Comparison of it: Wee see a *Weather-Glasse*, will finde the least difference of the *Weather*, in *Heat*, or *Cold*, when Men finde it not. And this *Perception* also, is sometimes at *Distance*, as well as upon the *Touch*; As when the *Load-Stone* draweth *Iron*; or *Flame*

Experiments
in Consort,
touching Per-
ception in *Bodies*
Insensible, ten-
ding to *Natu-
rall Divination*,
or *Subtill Tri-
als*.

Flame fireth *Naphtha* of *Babylon*, a great distance off. It is therefore a *Subject* of a very *Noble Enquiry*, to enquire of the more *Subtill Perceptions*; For it is another *Key* to open *Nature*, as well as the *Sense*; And sometimes *Better*. And besides, it is a *Principall Meanes* of *Naturall Divination*; For that which in these *Perceptions* appeareth early, in the great *Effects* commeth long after. It is true also, that it serveth to *discover* that which is *Hid*, as well as to *foretell* that which is to *Come*; As it is in many *Subtill Trialls*; As to trie whether *Seeds* be old, or new, the *Sense* cannot informe: But if you boile them in *Water*, the *New Seeds* will sprout sooner: And so of *Water*, the *Taste* will not discover the best *Water*; But the *Speedy Consuming* of it, and many other *Meanes*, which we have heretofore set downe, will discover it. So in all *Physiognomy*, the *Lineaments* of the *Body* will discover those *Naturall Inclinations* of the *Minde*, which *Disimulation* will conceale, or *Discipline* will suppress. Wee shall therefore now handle onely, those two *Perceptions*, which pertaine to *Naturall Divination*, and *Discovery*: Leaving the *Handling* of *Perception* in other Things, to be disposed Elsewhere. Now it is true, that *Divination* is attained by other *Meanes*; As if you know the *Causes*; If you know the *Concomitants*; you may judge of the *Effect* to follow: And the like may be said of *Discovery*; But we tie our Selves here, to that *Divination* and *Discovery* chiefly, which is Caused by an *Early*, or *Subtill Perception*.

The *Aptnesse* or *Propension* of *Aire*, or *Water*, to *Corrupt* or *Putrifie*, (no doubt,) is to be found before it breake forth into manifest *Effects* of *Diseases*, *Blasting*, or the like. Wee will therefore set downe some *Prognosticks* of *Pestilentiall* and *Vnwholsome Yeares*.

801

The *Wind* blowing much from the *South*, without *Raine*; And *Wormes* in the *Oake-Apple*; have beene spoken of before. Also the *Plenty* of *Frogs*, *Grashoppers*, *Flies*, and the like *Creatures* bred of *Putrefaction*, doth portend *Pestilentiall Yeares*.

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Great, and *Early Heats* in the *Spring*, (and namely in *May*,) without *Winds*, portend the same; And generally so doe *Yeares* with little *Wind*, or *Thunder*.

Great

Great Droughts in Summer, lasting till towards the End of August, and some Gentle Showers upon them; And then some Drie Weather againe; Doe portend a Pestilent Summer, the Yeare following: For about the End of August, all the Sweetnesse of the Earth, which goeth into Plants, and Trees, is exhaled; (And much more if the August be dry;) So that nothing then can breathe forth of the Earth, but a grosse Vapour, which is apt to Corrupt the Aire: And that Vapour, by the first Showers, if they be Gentle, is released, and commeth forth abundantly. Therefore they that come abroad soone after those Showers, are commonly taken with Sicknesse: And in Affricke, no Body will stirre out of doores, after the first Showers. But if the Showers come vehemently, then they rather wash and fill the Earth, than give it leave to breathe forth presently. But if Drie Weather come againe, then it fixeth and continueth the Corruption of the Aire, upon the first Showers begun; And maketh it of ill Influence, even to the Next Summer; Except a very Frostie Winter discharge it; Which seldome succedeth such Droughts.

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The Lesser Infections, of the Small Pockes, Purple Fevers, Agues, in the Summer Precedent, and hovering all Winter, doe portend a great Pestilence in the Summer following; For Putrefaction doth not rise to his height at once.

It were good to lay a Peece of Raw Flesh, or Fish, in the Open Aire; And if it Putrefie quickly, it is a signe of a Disposition in the Aire to Putrefaction. And because you cannot be informed, whether the Putrefaction be quicke or late, except you compare this Experiment with the like Experiment in another Yeare, it were not amisse, in the same Yeare, and at the same Time, to lay one Peece of Flesh, or Fish, in the Open Aire, and another of the same Kinde and Bignesse, within Doores: For I Judge, that if a generall Disposition be in the Aire to Putrefie, the Flesh, or Fish, will sooner Putrefie abroad, where the Aire hath more power, than in the House, where it hath lesse, being many wayes corrected. And this Experiment would be made about the End of March: For that season is likeliest to discover, what the Winter hath done; And what the Summer following will doe upon the Aire. And because the Aire (no doubt) receiveth great Tincture, and Infusion from the Earth; It were good to trie that Exposing of Flesh, or Fish, both upon a Stake of Wood, some height above the Earth, and upon the Flat of the Earth.

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Take May-Dew, and see whether it putrefie quickly, or no? For that likewise may disclose the Qualitie of the Aire, and Vapour of the Earth, more or lesse Corrupted.

806

A Drie March, and a Drie May, portend a Wholesome Summer, if there be a Showring Aprill betweene: But otherwise, it is a signe of a Pestilentiall Yeare.

807

As the Discoverie of the Disposition of the Aire, is good for the Prognosticks of Wholesome, and Unwholesome Yeares; So it is of much more use, for the Choice of Places to dwell in: At the least, for Lodges, and Retiring Places for Health; (For Mansion Houses respect Provisions, as well

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809

as Health;) Wherein the Experiments above mentioned may serve.

But for the Choice of Places, or Seats, it is good to make Triall, not only of Aptnesse of Aire to corrupt, but also of the Moisture and Driness of the Aire; and the Temper of it, in Heat, or Cold; For that may concerne Health diversly. We see that there be some Houses, wherein Sweet Meats will relent, and Baked Meats will mould, more than in others; And Wainscoats will also sweat more; so that they will almost run with Water: All which, (no doubt,) are caused chiefly by the Moistnesse of the Aire, in those Seats. But because it is better to know it, before a Man buildeth his House, than to finde it after, take the Experiments following.

810

Lay Wooll, or a Sponge, or Bread, in the Place you would trie, comparing it with some other Places; And see whether it doth not moisten, and make the Wooll, or Sponge, &c. more Ponderous, than the other? And if it doe, you may judge of that Place, as Situate in a Grosse, and Moist Aire.

811

Because it is certaine, that in some Places, either by the Nature of the Earth, or by the Situation of Woods, and Hills, the Aire is more Unequall, than in Others; And Inequalitie of Aire is ever an Enemy to Health; It were good to take two Weather-Glasses, Marches in all things, and to set them, for the same Houres of One day, in severall Places, where no Shade is, nor Enclosures: And to marke, when you set them, how farre the Water commeth; And to compare them, when you come againe, how the Water standeth then: And if you finde them Unequall, you may be sure that the Place where the Water is lowest, is in the Warmer Aire, and the other in the Colder. And the greater the Inequalitie be, of the Ascent, or Descent of the Water, the greater is the Inequalitie of the Temper of the Aire.

812

The Predictions likewise of Cold and Long Winters, and Hot and Drie Summers, are good to be knowne; As well for the Discoverie of the Causes, as for divers Provisions. That of Plenty of Hawes, and Heps, and Briar-Borries, hath beene spoken of before. If Wainscoat, or Stone, that have used to Sweat, be more drie, in the Beginning of Winter; Or the Drops of the Eaves of Houses come more slowly downe, than they use; it portendeth a Hard and Frostie Winter. The Cause is, for that it sheweth an Inclination of the Aire, to Drie weather; which in Winter is ever joyned with Frost.

813

Generally, a Moist and Coole Summer, portendeth a Hard Winter. The Cause is, for that the Vapours of the Earth, are not dissipated in the Summer, by the Sunne; And so they rebound upon the Winter.

814

A Hot and Drie Summer, and Autumne, and especially if the Heat and Drought extend farre into September, portendeth an Open Beginning of Winter; And Colds to succeed, toward the latter Part of the Winter, and the Beginning of the Spring: For till then, the former Heat and Drought beare the Sway; And the Vapours are not sufficiently Multiplied.

815

An Open and Warme Winter portendeth a Hot and Drie Summer: For the Vapours disperse into the winter Showres; Whereas Cold and Frost keepeth

keepeth them in, and transporteth them into the late *Spring*, and *Summer* following.

Birds that use to change *Countries*, at certaine *Seasons*, if they come Earlier, doe shew the *Temperature* of *Weather*, according to that *Country* whence they came: As the *winter-Birds*, (namely, *Woodcocks*, *Feldefares*, &c.) if they come earlier, and out of the *Northerne Countries*, with us shew *Cold Winters*. And if it be in the same *Country*, then they shew a *Temperature* of *Season*, like unto that *Season* in which they come: As *Swallows*, *Bats*, *Cuckoos*, &c. that come towards *Summer*, if they come early, shew a *Hot Summer* to follow.

The *Prognosticks*, more Immediate, of *weather* to follow soone after, are more Certaine than those of *Seasons*. The *Resounding* of the *Sea* upon the *Shoare*; And the *Murmur* of *Winds* in the *Woods*, without apparent *wind*; shew *Wind* to follow: For such *winds*, breathing chiefly out of the *Earth*, are not at the first perceived, except they be pent, by *Water*, or *Wood*. And therefore a *Murmur* out of *Caves* likewise portendeth as much.

The *Vpper Regions* of the *Aire*, perceive the *Collection* of the *Matter* of *Tempest*, and *Winds*, before the *Aire* here below: And therefore the *Obscuring* of the *Smaller Starres* is a *Signe* of *Tempests* following. And of this kinde you shall finde a Number of *Instances* in our *Inquisition De Ventis*.

Great Mountaines have a *Perception* of the *Disposition* of the *Aire* to *Tempests*, sooner than the *Valley's* or *Plaines* below: And therefore they say in *wales*, when certaine *Hills* have their *Night-Caps* on, they meane *Mischiefe*. The *Cause* is, for that *Temp-sts*, which are for the most part bred above, in the *Middle Region*, (as they call it,) are soonest perceived to collect in the *Places* next it.

The *Aire*, and *Fire*, have *Subtill Perceptions* of *Wind Rising*, before *Men* finde it. We see the *Trembling* of a *Candle* will discover a *Wind* that otherwise we doe not feele; And the *Flexuom Burning* of *Blames* doth shew the *Aire* beginneth to be unquiet; And so doe *Coales* of *Fire* by *Casting* off the *Asbes* more than they use. The *Cause* is, for that no *Wind*, at the first, till it hath strooke and driven the *Aire*, is Apparent to the *Sense*: But *Flame* is easier to move, than *Aire*: And for the *Asbes*, it is no marvell, though *Wind* unperceived shake them off; For wee usually trie, which way the *Wind* bloweth, by casting up *Grasse*, or *Chaffe*, or such light *Things*, into the *Aire*.

When *Wind* expireth from under the *Sea*; As it causeth some *Resounding* of the *Water*, (whereof wee spake before,) so it causeth some *Light Motions* of *Bubbles*, and *White Circles* of *Froth*. The *Cause* is, for that the *Wind* cannot be perceived by the *Sense*, untill there be an *Eruption* of a great *Quanticie*, from under the *Water*; And so it getteth into a *Body*: Whereas in the first *Putting up* it commeth in little *Portions*.

Wee spake of the *Asbes*, that *Coales* cast off; And of *Grasse*, and *Chaffe* carried by the *Wind*; So any *Light Thing* that moveth, when we finde no

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Wind, sheweth a Wind at hand: As when Feathers, or Downe of Thistles, fly to and fro in the Aire.

818

For Prognosticks of Weather from Living Creatures, it is to be noted; That Creatures that live in the Open Aire, (Sub Dio,) must needs have a Quicker Impression from the Aire, than Men that live most within Doores; And especially Birds, who live in the Aire, freest, and Clearest; And are aptest by their Voice to tell Tales, what they finde; And likewise by the Motion of their Flight to expresse the same.

823

Water-Fowles, (as Sea-Gulls, Murre-Hens, &c.) when they flocke and fly together, from the Sea towards the Shores; And contrariwise, Land-Birds, (as Crows, Swallows, &c.) when they fly from the Land to the Waters, and beat the Waters with their Wings; doe fore-shew Raine, and Wind. The Cause is, Pleasure, that both Kindes take in the Moistnesse, and Densitie of the Aire: And so desire to be in Motion, and upon the wing, whither soever they would otherwise goe: For it is no Marvell, that Water-Fowle doe joy most in that Aire, which is likest Water; And Land-Birds, also, (many of them,) delight in Bathing, and Moist Aire. For the same Reason also, many Birds doe proine their Feathers; And Geese doe gaggle; And Crows seeme to call upon Raine: All which is but the Comfort they seeme to receive in the Relenting of the Aire.

824

The Heron, when she soareth high, (so as sometimes she is seene to passe over a Cloud,) sheweth Winds: But Kites flying aloft, shew Faire and Dry Weather. The Cause may be, for that they both mount most into the Aire, of that Temper, wherein they delight: And the Heron, being a Water-Fowle, taketh pleasure in the Aire, that is Condensed: And besides, being but Heavy of Wing, needeth the Helpe of the Grosser Aire. But the Kite affecteth not so much the Grossenesse of the Aire, as the Cold and Freshnesse thereof; For being a Bird of Prey, and therefore Hot, she delighteth in the Fresh Aire; And (many times) flyeth against the Wind; As Trouts, and Salmones swimme against the Streame. And yet it is true also, that all Birds finde an Ease in the depth of the Aire; As Swimmers doe in a Deepe Water. And therefore when they are aloft, they can uphold themselves with their Wings Spred, scarce moving them.

825

Fishes, when they play towards the Top of the water, doe commonly foretell Raine. The Cause is, for that a Fish bating the Dry, will not approach the Aire, till it groweth Moist; And when it is Dry, will fly it, and swimme Lower.

826

Beasts doe take Comfort, (generally,) in a Moist Aire; And it maketh them eat their Meat better: And therefore Sheepe will get up betimes in the Morning, to feed, against Raine: And Cattell, and Deere, and Coneyes, will feed hard before Raine: And a Heifer, will put up his Nose, and snuffe in the Aire, against Raine.

The

The *Trifoile*, against *Raine*, swelleth in the *Stalke*; and so standeth more upright; For by *Wet*, *Stalkes* doe erect, and *Leaves* bow downe. There is a Small Red *Flower* in the *Stubble-Fields*, which Countrey People call the *Wincopie*; Which if it open in the *Morning*, you may be sure of a faire *Day* to follow.

827

Even in *Men*, *Aches*, and *Hurts*, and *Cornes*, doe engrieve, either towards *Raine*, or towards *Frost*: For the One maketh the *Humours* more to Abound; And the Other maketh them Sharper. So we see both *Extremes* bring the *Geut*.

828

Wormes, *Vermine*, &c. doe fore-shew (likewise) *Raine*: For *Earth-wormes* will come forth, and *Moules* will cast up more, and *Fleas* bite more, against *Raine*.

829

Solide Bodies likewise fore-shew *Raine*. As *Stones*, and *Wainscot*, when they *Sweat*: And *Boxes*, and *Peggs* of *Wood*, when they *Draw*, and *Wind* hard; Though the Former be but from an *Outward Cause*; For that the *Stone*, or *Wainscot*, turneth and beateth backe the *Aire* against it selfe; But the latter is an *Inward Swelling* of the *Body* of the *Wood* it selfe.

830

Appetite is moved chiefly by Things that are *Cold*, and *Dry*; The Cause is, for that *Cold* is a Kinde of *Indigence* of *Nature*, and calleth upon Supply; And so is *Drinesse*: And therefore all *Soure Things*, (as *Vinegar*, *Iuyce* of *Lemons*, *Oyle* of *Vitrioll*, &c.) provoke *Appetite*. And the *Disease*, which they call *Appetitus Caninus*, consisteth in the *Matter* of an *Acide* and *Glassy Flegme*, in the *Mouth* of the *Stomach*. *Appetite* is also moved by *Soure Things*; For that *Soure Things*, induce a *Contraction* in the *Nerves*, placed in the *Mouth* of the *Stomach*; Which is a great Cause of *Appetite*. As for the Cause, why *Onions*, and *Salt*, and *Pepper*, in *Baked Meats*, move *Appetite*, it is by *Vellication* of those *Nerves*; For *Motion* whetteth. As for *Worme-wood*, *Olives*, *Capers*, and others of that kinde, which participate of *Bitternesse*, they move *Appetite* by *Absterfion*. So as there be foure Principall Causes of *Appetite*; The *Refrigeration* of the *Stomach*, joyned with some *Drinesse*; *Contraction*; *Vellication*; And *Absterfion*: Besides *Hunger*, which is an *Emptinesse*: And yet *Over-Fasting* doth (many times) cause the *Appetite* to cease; For that *Want* of *Meat* maketh the *Stomach* draw *Humours*; And such *Humours* as are *Light*, and *Cholericke*, which quench *Appetite* most.

Experiment Solitary, touching the Nature of Appetite in the Stomach.

831

IT hath beene observed by the *Ancients*, that where a *Raine-Bow* seemeth to hang over, or to touch, there breatheth forth a *Sweet Smell*. The Cause is, for that this happeneth but in certaine Matters, which have in themselves some *Sweetnesse*; Which the *Gentle Dew* of the *Raine-Bow* doth draw forth: And the like doe *Soft Showers*; For they also make the *Ground* Sweet: But none are so delicate as the *Dew* of the *Rain-Bow*, where it falleth. It may be also, that the *Water* it selfe hath some *Sweetnesse*: For the *Raine-Bow* consisteth of a *Glomeration* of *Small Drops*, which cannot possibly fall, but from the *Aire*, that is very *Low*: And there-

Experiment Solitary, touching Sweetnesse of Odour from the Rain-bow.

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Experiment
Solitary, tou-
ching Sweet
Smells.

833

therefore may hold the verie Sweetnesse of the Herbs, and Flowers, as a *Distilled Water*: For *Raine*, and other *Dew*, that fall from high, cannot preserve the Smell, being dissipated in the drawing up: Neither doe we know, whether some *Water* it selfe, may not have some degree of Sweetnesse. It is true, that wee finde it sensibly in no *Poole*, *River*, nor *Fountain*; But good *Earth*, newly turned up, hath a *Freshnesse*; and good *Sent*; Which *Water*, if it be not too *Equall*, (For *Equall Objects* never move the *Sense*;) may also have. Certaine it is, that *Bay-Salt*, which is but a kinde of *Water Congealed*, will sometimes smell like *Violets*.

Experiment
Solitary, tou-
ching the Cor-
poreall Sub-
stance of Smells.

834

TO Sweet Smells Heat is requisite, to Concoct the Matter; And some Moisture to Spread the Breath of them. For Heat, we see that Woods, and Spices, are more Odorate in the Hot Countries, than in the Cold: For Moisture, we see that Things too much Dried, lose their Sweetnesse: And Flowers growing, smell better in a Morning, or Evening, than at Noone. Some Sweet Smells are destroyed by Approach to the Fire; As Violets, Wall-Flowers, Gilly-Flowers, Pincks; And generally all Flowers that have Coole and Delicate Spirits. Some continue both on the Fire, & from the Fire, As Rose-water, &c. Some doe scarce come forth, or at least not so pleasantly, as by meanes of the Fire; as Iuniper, Sweet Gums, &c. And all Smells, that are Enclosed in a Fast Body: But (generally) those Smells are the most Gratesull, where the Degree of Heat is Small; Or where the strength of the Smell is allayed; For these Things doe rather wooe the Sense, than Sariate it. And therefore the Smell of Violets, and Roses, exceedeth in Sweetnesse that of Spices, and Gummes; And the Strongest Sort of Smells, are best in a weft, a farre off.

Experiment
Solitary, tou-
ching the Cor-
poreall Sub-
stance of Smells.

834

IT is certaine, that no Smell issueth, but with Emission of some Corporeall Substance; Not as it is in Light, and Colours, and in Sounds. For we see plainly, that Smell doth spread nothing that distance, that the other doe. It is true, that some Woods of Oranges, and Heathes of Rose-Mary, will Smell a great way into the Sea, perhaps twentie Miles; But what is that, since a Peale of Ordnance will doe as much, which moveth in a small compasse? Whereas those Woods, and Heathes, are of Vast Spaces: Besides wee see that Smells doe adhere to Hard Bodies; As in Perfuming of Gloves, &c. which sheweth them Corporeall; And doe Last a great while, which Sounds, and Light doe not.

Experiment
Solitary, tou-
ching Fetide
and Fragrant
Odours.

835

THE Excrements of most Creatures Smell ill; Chiefly to the same Creature that voideth them: For we see, besides that of Man, that Pigeons, and Horses thrive best, if their Houses, and Stables be kept Sweet; And so of Cage-Birds: And the Cat burieth that which shee voideth: And it holdeth chiefly in those Beasts, which feed upon Flesh. Dogs (almost) onely of Beasts, delight in Fetide Odours; Which sheweth there is somewhat in their Sense of Smell, differing from the Smells of other Beasts. But the Cause, why Excrements smell ill, is manifest; For that the

Body

Body it selfe rejecteth them; Much more the *Spirits*: And we see, that those *Excrements*, that are of the *First Digestion*, Smell the worst; As the *Excrements* from the *Belly*: Those that are from the *Second Digestion*, lesse ill; As *Urine*; And those that are from the *Third*, yet lesse; For *Sweat* is not so bad, as the other two; Especially of some *Persons*, that are full of *Heat*. Likewise most *Putrefactions* are of an *Odious Smell*: For they smell either *Fetide*, or *Mouldy*. The *Cause* may be, for that *Putrefaction* doth bring forth such a *Consistence*, as is most *Contrarie* to the *Consistence* of the *Body*, whilst it is *Sound*: For it is a meere dissolution of that *Forme*. Besides, there is another *Reason* which is *Profound*: And it is, that the *Objects* that please any of the *Senses*, have (all) some *Equalitie*, and (as it were) *Order*, in their *Composition*: But where those are wanting, the *Object* is ever *Ingrate*. So *Mixture* of many *Disagreeing Colours* is ever unpleasant to the *Eye*: *Mixture* of *Discordant Sounds* is unpleasant to the *Eare*: *Mixture*, or *Hotch-Potch* of many *Tastes*, is unpleasant to the *Taste*: *Harshnesse* and *Ruggednesse* of *Bodies*, is unpleasant to the *Touch*: Now it is certaine, that all *Putrefaction*, being a *Dissolution* of the first *Forme*, is a meere *Confusion*, and *Unformed Mixture* of the *Part*. Nevertheless, it is strange, and seemeth to *Grosse* the former *Observation*, that some *Putrefactions* and *Excrements* doe yeeld *Excellent Odours*; As *Civet*, and *Muske*; And as some thinke *Amber-Greece*: For divers take it, (though unprobably,) to come from the *Sperme* of *Fish*: And the *Mosse*, we spake of from *Apple-Trees*, is little better than an *Excretion*. The *Reason* may be, for that there passeth in the *Excrements*, and remaineth in the *Putrefactions*, some good *Spirits*; especially where they proceed from *Creatures*, that are verie *Hot*. But it may be also joyned with a further *Cause*, which is more *Subtill*; And it is, that the *Senses* love not to be *Overpleased*; But to have a *Commixture* of somewhat that is in it selfe *Ingrate*. Certainly, we see how *Discords* in *Musicke*, falling upon *Concords*, make the *Sweetest Straines*: And we see againe, what *Strange Tastes* delight the *Taste*; As *Red-Herrings*, *Caveary*, *Parmizan*, &c. And it may be, the same holdeth in *Smells*. For those kinde of *Smells*, that we have mentioned, are all *Strong*, and doe *Pull* and *Vellicate* the *Sense*. And wee finde also, that *Places* where Men *Urine*, commonly have some *Smell* of *Violets*: And *Urine*, if one hath eaten *Nutmeg*, hath so too.

The *Sloathfull*, *Generall*, and *Indefinite Contemplations*, and *Nations*, of the *Elements*, and their *Conjugations*; Of the *Influences* of *Heaven*; Of *Heat*, *Cold*, *Moisture*, *Drought*, *Qualities* *Active*, *Passive*; And the like; have swallowed up the true *Passages*, and *Processes*, and *Affects*, & *Consistences* of *Matter*, and *Naturall Bodies*. Therefore they are to be set aside, being

but *Notionall*, and ill *Limited*; And *Definite Axiomes* are to be drawne out of *Measured Instances*: And so Assent to be made to the more *Generall Axiomes*, by *Scale*. And of these *Kind*es of *Processes* of *Natures*, and *Characters* of *Matter*, we will now set downe some *Instances*.

Experiment
Solitary, touch-
ing the Cause
of Putre-
faction.

836

AL L *Putrefactions* come chiefly from the *Inward Spirits* of the *Body*; And partly also from the *Ambient Body*, be it *Aire*, *Liquour*, or whatsoever else. And this last, by two *Meanes*: Either by *Ingresse* of the *Substance* of the *Ambient Bodie*, into the *Body Putrified*; Or by *Excitation* and *Solicitation* of the *Body Putrified*, and the *Parts* thereof, by the *Body Ambient*. As for the *Received Opinion*, that *Putrefaction* is caused, either by *Cold*, or *Peregrine* and *Preternaturall Heat*, it is but *Nugation*: For *Cold* in *Things Inanimate*, is the greatest *Enemie* that is, to *Putrefaction*, though it extinguisheth *Vivification*, which ever consisteth in *Spirits Attenuate*, which the *Cold* doth congeale, and coagulate. And as for the *Peregrine Heat*, it is thus farre true; That if the *Proportion* of the *Adventitious Heat*, be greatly *Predominant*, to the *Naturall Heat*, and *Spirits* of the *Body*, it tendeth to *Dissolution*, or *Notable Alteration*. But this is wrought by *Emission*, or *Suppression*, or *Suffocation*, of the *Native Spirits*; And also by the *Disordination*, and *Discomposure* of the *Tangible Parts*; And other *Passages* of *Nature*; And not by a *Conflict* of *Heats*.

Experiment
Solitary, touch-
ing Bodies
Imperfectly
Mixed.

837

IN *Variety*, or *Maine Alterations* of *Bodies*, there is a *Medium* betweene the *Body*, as it is at first, and the *Body Resulting*; which *Medium* is *Corpus imperfectum*, and is *Transitorie*, and not durable; As *Mists*, *Smoakes*, *Vapours*, *Chylus* in the *Stomach*, *Living Creatures* in the first *Vivification*: And the *Middle Action*, which produceth such *Imperfect Bodies*, is fitly called, (by some of the *Ancients*;) *Inquination*, or *Inconcoction*, which is a *Kind* of *Putrefaction*; For the *Parts* are in *Confusion*, till they settle, one way, or other.

Experiment
Solitary, touch-
ing Conco-
ction and Cru-
dity.

838

THE word *Concoction*, or *Digestion*, is chiefly taken into use from *Living Creatures*, & their *Organs*; And from thence extended to *Liquours*, and *Fruits*, &c. Therefore they speake of *Meat Concocted*; *Vrine* and *Excrements Concocted*; And the *Four* *Disgestions*, (In the *Stomach*; In the *Liver*; In the *Arteries* and *Nerves*; And in the *Severall Parts* of the *Bodie*;) are likewise called *Concoctions*: And they are all made to be the *Workes* of *Heat*: All which *Notions* are but ignorant *Catches* of a few *Things*, which are most *Obvious* to *Mens Observations*. The *Constant* *Notion* of *Concoction* is, that it should signifie the *Degrees* of *Alteration* of one *Body* into another, from *Crudity* to *Perfect Concoction*; Which is the *Vicinitie* of that *Action*, or *Processe*: And while the *Body* to be *Converted* and *Altered*, is too strong for the *Efficient*, that should *Convert*, or *Alter* it, (whereby it resisteth and holdeth fast in some degree the first

Ferre,

Forme, Or Consistence,) it is (all that while,) Crude, and Incocted; And the Proesse is to be called *Cruditie* and *Incoction*. It is true, that *Concoction* is, in great part, the Worke of Heat; But not the Worke of Heat alone: For all Things, that further the *Conversion*, or *Alteration*, (as *Rest*, *Mixture* of a *Body* already *Concocted*, &c.) are also *Meanes* to *Concoction*. And there are of *Concoction* two *Periods*; The one *Assimilation*, or *Absolute Conversion* and *Subaction*; The other *Maturation*: whereof the Former is most conspicuous in the *Bodies* of *Living Creatures*; In which there is an *Absolute Conversion*, and *Assimilation* of the *Nourishment* into the *Body*: And likewise in the *Bodies* of *Plants*: And againe in *Metalls*, where there is a full *Transmutation*. The other, (which is *Maturation*,) is seene in *Liquours*, and *Fruits*; wherein there is not desired, nor pretended, an utter *Conversion*, but onely an *Alteration* to that *Forme*, which is most sought, for *Mans* use; As in *Clarifying* of *Drinkes*; *Ripening* of *Fruits*, &c. But note, that there be two *Kindes* of *Absolute Conversions*; The one is, when a *Body* is converted into another *Body*, which was before; As when *Nourishment* is turned into *Flesh*; That is it which wee call *Assimilation*. The other is, when the *Conversion* is into a *Body* meerely New, and which was not before; As if *Silver* should be turned to *Gold*; or *Iron* to *Copper*: And this *Conversion* is better called, for distinctions sake, *Transmutation*.

There are also divers other *Great Alterations* of *Matter*, and *Bodies*, besides those that tend to *Concoction*, and *Maturation*; For whatsoever doth so alter a *Body*, as it returneth not againe to that it was, may be called *Alteratio Major*: As when *Meat* is *Boyled*, or *Roasted*, or *Fried*, &c. Or when *Bread* and *Meat* are *Baked*; Or when *Cheese* is made of *Curds*, or *Butter* of *Creame*, or *Coales* of *wood*, or *Bricks* of *Earth*; And a Number of others. But to apply *Notions Philosophicall* to *Plebeian Terms*; Or to say, where the *Notions* cannot fitly be reconciled, that there wanteth a *Terme*, or *Nomenclature* for it; (as the *Ancients* used;) They be but *Shifts* of *Ignorance*; For *Knowledge* will be ever a *Wandering* and *Indigested Thing*, if it be but a *Commixture* of a few *Notions*, that are at hand and occurre, and not excited from sufficient Number of *Instances*, and those well collated.

The *Consistences* of *Bodies* are verie divers: *Dense*, *Rare*, *Tangible*, *Pneumaticall*; *Volatile*, *Fixed*; *Determinate*, *Not Determinate*, *Hard*, *Soft*; *Cleaving*, *Not Cleaving*; *Congeeable*, *Not Congeeable*; *Liquefiable*, *Not Liquefiable*; *Fragile*, *Tough*; *Flexible*, *Inflexible*; *Tractile*, or to be drawn forth in length, *Intractile*; *Porous*, *Solide*; *Equall*, and *Smooth*, *Unequall*; *Venous*, and *Fibrous*,

Experiment
Solitary, touch-
ing Alterati-
ons, which may
be called
Majors.

839

Experiment
Solitary, touch-
ing Alterati-
ons, which may
be called
Majors.

839

Experiment
Solitary, touch-
ing Alterati-
ons, which may
be called
Majors.

148

*brous, and with Graines, Entire; And divers Others; All which to referre to Heat, and Cold; and Moisture, & Drought, is a Compendious and Inutile Speculation. But of these see principally our Abecedarium Naturæ; And otherwise Spar-
sim in this our Sylva Sylvarum: Neverthelesse in some good part, We shall handle divers of them now presently.*

Experiment
Solitary, tou-
ching Bodies
Liquefiable, and
not Liquefiable.

840

Liquefiable, and Not Liquefiable, proceed from these Causes: Liquefa-
tion is ever caused by the Detention of the Spirits, which play with-
in the Body, and Open it. Therefore such Bodies, as are more Turgide of
Spirit; Or that have their Spirits more straitly Imprisoned; Or againe
that hold them Better Pleased and Content; are Liquefiable: For these
three Dispositions of Bodies, doe arrest the Emission of the Spirits. An Ex-
ample of the first two Properties is in Metalls; And of the last in Grease,
Pitch, Sulphure, Butter, Wax, &c. The Disposition not to Liquefie procee-
deth from the easie Emission of the Spirits, whereby the Groffer Parts
contract; And therefore, Bodies lejune of Spirits; Or which part with
their Spirits more Willingly; are not Liquefiable; As Wood, Clay, Free-
Stone, &c. But yet, even many of those Bodies, that will not Melt, or will
hardly Melt, will notwithstanding Soften; As Iron in the Forge; And a
Sticke bathed in Hot Ashes, which thereby becommeth more Flexible.
Moreover, there are some Bodies, which doe Liquefie, or dissolve by Fire;
As Metalls, Wax, &c. And other Bodies, which dissolve in Water; As Salt,
Sugar, &c. The Cause of the former proceedeth from the Dilatation of
the Spirits by Heat: The Cause of the Latter proceedeth from the Ope-
ning of the Tangible Parts, which desire to receive the Liquour. Again, there
are some Bodies, that dissolve with both; As Gumme, &c. And
those be such Bodies, as on the One Side have good store of Spirit; And
on the other Side, have the Tangible Parts Indigent of Moisture; For the
former helpeth to the Dilating of the Spirits by the Fire; And the Lat-
ter stimulateth the Parts to Receive the Liquour.

Experiment
Solitary, tou-
ching Bodies
Fragile, and
Tough.

841

OF Bodies, some are Fragile; And some are Tough, and Not Fragile;
And in the Breaking, some Fragile Bodies breake but where the
Force is; Some shatter and flie in many Peeces. Of Fragilitie the Cause
is an Impotencie to be Extended: And therefore Stone is more Fragile
than Metall; And so Fiſile Earth is more Fragile than Crude Earth;
And Dry Wood than Greene. And the Cause of this Vnaptneſſe to Extensi-
on, is the Small Quantitie of Spirits; (For it is the Spirit that furthereth
the Extension or Dilatation of Bodies;) And it is ever Concomitant with
Porositie, and with Drineſſe in the Tangible Parts: Contrariwise, Tough
Bodies have more Spirit, and fewer Pores, and Moister Tangible Parts:
Therefore we see that Parchment, or Leather will stretch, Paper will not;
woollen Cloth will tenter, Linnen scarcely.

All

AL L Solide Bodies consist of Parts of two severall Natures; Pneumaticall, and Tangible; And it is well to be noted, that the Pneumaticall Substance is in some Bodies, the Native Spirit of the Body; And in some other, plaine Aire that is gotten in; As in Bodies desiccate, by Heat, or Age: For in them, when the Native Spirit goeth forth, and the Moisture with it, the Aire with time getteth into the Pores. And those Bodies are ever the more Fragile; For the Native Spirit is more Teelding, and Extensive, (especially to follow the Parts,) than Aire. The Native Spirits also admit great Diverfitie; As Hot, Cold, Active, Dull, &c. Whence proceed most of the Vertues, and Qualities (as we call them) of Bodies: But the Aire Intermixt, is without Vertues, and maketh Things Inspide, and without any Extimulation.

Experiment
Solitary, touch-
ing the Two
Kinds of Pne-
matics in Bo-
dies.

842

THe Concretion of Bodies is (commonly) solved by the Contrarie; As Ice, which is congealed by Cold, is dissolved by Heat; Salt and Sugar, which are Excocted by Heat, are Dissolved by Cold, and Moisture. The Cause is, for that these Operations, are rather Returnes to their former Nature, than Alterations: So that the Contrarie cureth. As for Oyle, it doth neither easily congeale with Cold, nor thicken with Heat. The Cause of both Effects, though they be produced by Contrarie Efficients, seemeth to be the Same; And that is, because the Spirit of the Oyle, by either Meanes, exaleth little; For the Cold keepeth it in; and the Heat, (except it be Vehement,) doth not call it forth. As for Cold, though it take hold of the Tangible Parts, yet as to the Spirits, it doth rather make them Swell, than Congeale them: As when Ice is congealed in a Cup, the Ice will Swell in steed of Contracting; And sometimes Rift.

Experiment
Solitary, touch-
ing Concreti-
on, and Dissolu-
tion of Bodies.

843

OF Bodies, some (we see) are Hard, and some Soft: The Hardnesse is caused (chiefly) by the lejunenesse of the Spirits; And their Impartie with the Tangible Parts: Both which, if they be in a greater degree, maketh them, not only Hard, but Fragile, and lesse Enduring of Pressure; As Steele, Stone, Glasse, Drie Wood, &c. Softnesse cometh (contrariwise) by the Greater Quantitie of Spirits; (which ever helpeth to Induce Teelding and Cession;) And by the more Equall Spreading of the Tangible Parts, which thereby are more Sliding, and Following; As in Gold, Lead, Wax, &c. But note, that Soft Bodies, (as we use the word,) are of two Kinds; The one, that easily giveth place to another Body, but altereth not Bulke, by Rising in other Places: And therefore we see that Wax, if you put any Thing into it, doth not rise in Bulke, but only giveth Place: For you may not thinke, that in Printing of Wax, the Wax riseth up at all; But onely the depressed Part giveth place, and the other remaineth as it was. The other, that altereth Bulke in the Cession; As Water, or other Liquours, if you put a Stone, or any Thing into them, they give place (indeed) easily, but then they rise all over: Which is a False Cession; For it is in Place, and not in Body.

Experiment
Solitary, touch-
ing Hard
& Soft Bodies.

844

All

Experiment
Solitary, touch-
ing Bodies
Ductile, and
Tensile.

845

848

ALL Bodies Ductile, and Tensile, (as Metals that will be drawne into Wires; wooll and Towe that will be drawne into Yarne, or Thred;) have in them the Appetite of Not Discontinuing, Strong; Which maketh them follow the Force, that pulleth them out; And yet so, as not to Discontinue or forsake their owne Body. Viscous Bodies, (likewise,) as Pitch, Wax, Bird-Lime, Cheese toasted, will draw forth, and roape. But the difference betweene Bodies Fibrous, and Bodies Viscous, is Plaine; For all wooll, and Towe, and Cotton, and Silke, (especially raw Silke,) have, besides their Desire of Continuance, in regard of the Tenuitie of their Thred, a Greedinesse of Moisture; And by Moisture to joyne and incorporate with other Thred; Especially if there be a little Wreathing; As appeareth by the Twisting of Thred; And the Practice of Twirling about of Spindles. And wee see also, that Gold and Silver Thred cannot be made without Twisting.

Experiment
Solitary, touch-
ing other
Passions of
Matter, and
characters of
Bodies.

846

Experiment
Solitary, touch-
ing other
Passions of
Matter, and
characters of
Bodies.

848

THE Differences of Impresible and Not Impresible; Figurable and Not Figurable; Mouldable and Not Mouldable; Scissible and Not Scissible; And many other Passions of Matter, are Plebeian Notions, applied unto the Instruments and Uses which Men ordinarily practise; But they are all but the Effects of some of these Causes following; Which we will Enumerate without Applying them, because that would be too long. The First is the Cession, or Not Cession of Bodies, into a Smaller Space or Roome, keeping the Outward Bulke, and not flying up. The Second is the Stronger or weaker Appetite, in Bodies, to Continuities, and to flie Discontinuitie. The Third is the Disposition of Bodies, to Contract, or Not Contract; And againe, to Extend, or Not Extend. The Fourth is the Small Quantitie, or Great Quantitie, of the Pneumaticall in Bodies. The Fifth is the Nature of the Pneumaticall, whether it be Native Spirit of the Body, or Common Aire. The Sixth is, the Nature of the Native Spirits in the Body, whether they be Active and Eager, or Dull and Gentle. The seventh is the Emission or Detention of the Spirits in Bodies. The Eight is the Dilatation, or Contraction of the Spirits in Bodies, while they are detained. The Ninth is the Collocation of the Spirits in Bodies; whether the Collocation be Equall, or Vnequall; And againe, whether the Spirits be Coacervate, or Diffused. The Tenth is the Densitie, or Raritie of the Tangible Parts. The Eleventh is the Equalitie or Inequalitie of the Tangible Parts. The Twelfth is the Digestion, or Cruditie of the Tangible Parts. The Thirteenth is the Nature of the Matter, whether Sulphureous or Mercuriall, Watric or Oylie, Drie and Terrestriall, or Moist and Liquid; which Natures of Sulphureous and Mercuriall, seeme to be Natures Radicall, and Principall. The Fourteenth is the Placing of the Tangible Parts, in Length, or Transverse; (As it is in the Warpe, and the Woofe, of Textiles;) More Inward, or More Outward; &c. The Fifteenth is the Porositie, or Imporositie betwixt the Tangible Parts; And the Greatnesse, or Smallnesse of the Pores. The Sixteenth is the Collocation and Posture of the Pores. There may be more Causes; but these doe occurre for the Present.

Take

Take *Lead*, and melt it, and in the Middest of it, when it beginneth to Congeale, make a little Dint, or Hole, and put *Quicke-silver* wrapped in a Peece of *Linnen* into that Hole, and the *Quicke-silver* will fix, and run no more, and endure the Hammer. This is a Noble Instance of *Induration*, by Consent of one *Body* with another, and Motion of *Excitation* to *Imitate*; For to ascribe it onely to the *Vapour* of *Lead*, is lesse Probable. *Quare* whether the *Fixing* may be in such a degree, as it will be Figured like other *Metals*? For if so, you may make *Works* of it for some purposes, so they come not neere the *Fire*.

Experiment
Solitary, touching
Induration by Sympa-
thie.
847
178

Sugar hath put downe the use of *Honey*; In somuch as wee have lost those *Observations*, and *Preparations* of *Honey*, which the *Ancients* had, when it was more in Price. First, it seemeth that there was, in old time, *Tree-Honey*, as well as *Bee-Honey*; Which was the *Teare* or *Blond* issuing from the *Tree*: In somuch as one of the *Ancients* relateth, that in *Ireland*, there was *Honey* issuing from the *Box-Trees*, which made Men Mad. Againe, in Ancient time, there was a Kinde of *Honey*, which either of the owne Nature, or by Art, would grow as Hard as *Sugar*; And was not so Lushious as Ours. They had also a *wine* of *Honey*, which they made thus. They crushed the *Honey* into a great *Quantitie* of *Water*, and then strained the *Liquour*; After they boyled it in a *Copper* to the halfe: Then they powred it into *Earthen Vessels*, for a small time; And after tunned it into *Vessels* of *Wood*, and kept it for many yeares. They have also, at this day, in *Russia*, and those *Northerne Countries*, *Mead Simple*, which (well made, and seasoned) is a good wholesome *Drinke*, and very Cleare. They use also in *wales*, a Compound *Drinke* of *Mead*, with *Herbs*, and *Spices*. But meane-while it were good, in recompence of that we have lost in *Honey*, there were brought in use a *Sugar-Mead*, (for so wee may call it,) though without any *Mixture* at all of *Honey*; And to brew it, and keepe it stale, as they use *Mead*; For certainly, though it would not be so *Abstersive*, and *Opening*, and *Solutive* a *Drinke* as *Mead*; yet it will be more gratefull to the *Stomach*, and more *Lenitive*, and fit to be used in *Sharpe Diseases*: For wee see, that the use of *Sugar* in *Beere*, and *Ale*, hath good *Effects* in such Cases.

Experiment
Solitary, touching
Honey and *Sugar*.
848

Experiment
Solitary, touching
the *Finer*
Sort of *Base*
Metals.
848

Experiment
Solitary, touching
the *Finer*
Sort of *Base*
Metals.
849

Experiment
Solitary, touching
Cements
and *Quarries*.
850

It is reported by the *Ancients*, that there was a Kinde of *Steele*, in some places, which would polish almost as white and bright as *Silver*. And that there was in *India* a Kinde of *Brasse*, which (being polished) could scarce be discerned from *Gold*. This was in the *Naturall Vre*; But I am doubtfull, whether Men have sufficiently refined *Metals*, which we count *Base*; As whether *Iron*, *Brasse*, and *Tinne*, be refined to the Heighth? But when they come to such a *Fineness*, as serveth the ordinary use, they trie no further.

There have beene found certaine *Cements* under *Earth*, that are very Soft; And yet, taken forth into the *Sunne*, harden as Hard as *Marble*: There

Experiment
Solitary, touch-
ing the Al-
tering of the Co-
lour of Haires
and Feathers.

851

There are also ordinary *Quarries* in *Somerset-shire*, which in the *Quar-*
ry cut soft to any *Bignesse*, and in the *Building* prove firme, and hard.

Living *Creatures* (generally) doe change their *Haire* with *Age*, tur-
ning to be *Gray*, and *White*: As is seene in *Men*, though some Ear-
lier, some Later; In *Horses*, that are Dappled, and turne *White*; In *Old*
Squirrels, that turne *Grisly*; And many Others. So doe some *Birds*;
As *Cygnets*, from *Gray* turne *white*; *Hawkes*, from *Browne* turne more
White: And some *Birds* there be, that upon their *Moulting*, doe turne
Colour, As *Robin-Red-breasts*, after their *Moulting*, grow to be *Red* againe,
by degrees; So doe *Gold-Finches* upon the *Head*. The *Cause* is, for that
Moisture doth (chiefly) colour *Haire*, and *Feathers*; And *Drieffe* tur-
neth them *Gray* and *White*; Now *Haire* in *Age* waxeth *Drier*: So doe
Feathers. As for *Feathers*, after *Moulting*, they are *Young Feathers*, and
so all one as the *Feathers* of *Young Birds*. So the *Beard* is younger than
the *Haire* of the *Head*, and doth (for the most part,) wax *Hoare* later,
Out of this *Ground*, a *Man* may devise the *Meanes* of *Altering* the *Colour*
of *Birds*, and the *Retardation* of *Hoare-Haires*. But of this see the fifth
Experiment.

Experiment
Solitary, touch-
ing the Dif-
ferences of Li-
ving Creatures,
Male & Female.

852

The *Difference* betweene *Male* and *Female*, in some *Creatures*, is not
to be discerned, otherwise than in the *Parts* of *Generation*: As in
Horses and *Mares*, *Dogs* and *Bitches*, *Doves* He and *Shee*, and others. But
some differ in *Magnitude*, and that diversly; For in most the *Male* is the
greater; As in *Man*, *Pheasants*, *Peacocks*, *Turkey's*; and the like: And in some
few, as in *Hawkes*, the *Female*. Some differ in the *Haire*, and *Feathers*, both
in the *Quantitie*, *Crispation*, and *Colours* of them; As He *Lions* are *Hirsute*,
and have great *Maines*; The *She's* are smooth like *Cats*. *Bulls* are more
Crispe upon the *Fore-head* than *Cowes*; The *Peacocke*, and *Pheasant-Cocke*,
and *Gold-Finch-Cocke*, have glorious and fine *Colours*; The *Henn's* have
not. Generally, the *Hees* in *Birds* have the fairest *Feathers*. Some differ
in divers *Features*; As *Bucks* have *Hornes*, *Doe's* none; *Rammes* have more
Wreathed Hornes than *Ewes*; *Cocks* have great *Combes* and *Spurres*. *Henns*
little or none; *Boares* have great *Fangs*, *Sowes* much lesse; The *Turky-*
Cocke hath great and *Swelling Gills*, the *Hen* hath lesse; *Men* have gene-
rally *Deeper* and *Stronger Voices* than *women*. Some differ in *Facultie*;
As the *Cocks* amongst *Singing Birds*, are the best *Singers*. The *Chiefe*
Cause of all these, (no doubt,) is, for that the *Males* have more *Strength*
of *Heat* than the *Females*; Which appeareth manifestly in this, that all
young Creatures Males, are like *Females*; And so are *Eunuchs*, and *Gelt*
Creatures of all kinds, liker *Females*. Now *Heat* causeth *Greatnesse* of
Growth, generally, where there is *Moisture* enough to worke upon: But
if there be found in any *Creature*, (which is seene rarely,) an *Over-great*
Heat in proportion to the *Moisture*, in them the *Female* is the greater;
As in *Hawkes*, and *Sparrowes*. And if the *Heat* be ballanced with the
Moisture, then there is no *Difference* to be seene betweene *Male* and *Fe-*
male:

male: As in the *Instances* of *Horses*, and *Dogs*. Wee see also, that the *Hornes* of *Oxen*, and *Cowes*, for the most part, are Larger than the *Bulls*; which is caused by abundance of *Moisture*, which in the *Hornes* of the *Bull* faileth. Again, *Heat* causeth *Pilositie*, and *Crispation*; And so likewise *Beards* in *Men*. It also expelleth finer *Moisture*, which Want of *Heat* cannot Expell: And that is the Cause of the *Beautie* and *Variety* of *Fethers*: Again *Heat* doth put forth many *Excrescences*, and much Solide *Matter*, which Want of *Heat* cannot do: And this is the Cause of *Hornes*, and of the *Greatnesse* of them; And of the *Greatnesse* of the *Combs* and *Spurres* of *Cocks*, *Gills* of *Turkey-Cocks*, and *Fangs* of *Bears*. *Heat* also dilateth the *Pipes*, and *Organs*, which causeth the *Deepe* of the *Voice*. Again, *Heat* refineth the *Spirits*, and that causeth the *Cock Singing Bird*, to Excell the *Hen*.

There be *Fishes* greater than any *Beasts*; As the *Whale* is farre greater than the *Elephant*. And *Beasts* are (generally) greater than *Birds*. For *Fishes*, the Cause may be, that because they Live not in the *Aire*, they have not their *Moisture* drawne & Soaked by the *Aire*, and *Sun-Beames*. Also they rest alwayes, in a manner, and are supported by the *Water*; whereas *Motion* and *Labour* doe consume. As for the *Greatnesse* of *Beasts*, more than of *Birds*, it is caused, for that *Beasts* stay Longer time in the *Womb*, than *Birds*, and there Nourish, and Grow; Whereas in *Birds*, after the *Egge* Lay'd, there is no further *Growth*, or *Nourishment* from the *Female*: For the *Sitting* doth *Vivifie*, and not Nourish.

We have partly touched before the *Reasons* of *Producing Fruits*, without *Coares*, or *Stones*. And this wee adde further, that the Cause must be *Abundance* of *Moisture*; For that the *Coare*, and *Stone* are made of a *Dry Sap*: And wee see that it is possible, to make a *Tree* put forth onely in *Blossome*, without *Fruit*; As in *Cherries* with *Double Flowers*; Much more in *Fruit* without *Stone*, or *Coares*. It is reported, that a *Cions* of an *Apple*, grafted up on a *Colewort-Stalk*, sendeth forth a great *Apple* without a *Coare*. It is not unlikely, that if the *Inward Pith* of a *Tree*, were taken out, so that the *Juyce* came onely by the *Barke*, it would worke the *Effect*. For it hath beene observed, that in *Pollards*, if the *Water* get in on the *Top*, and they become *Hollow*, they put forth the more. We adde also, that it is delivered for certaine by some, that if the *Cions* be grafed, the *Small End* downwards, it will make *Fruit* have little or no *Coares*, and *Stones*.

Tobacco is a thing of great Price, if it be in request. For an *Acre* of it will be worth, (as is affirmed,) two Hundred Pounds, by the yeare, towards Charge. The Charge of making the Ground, and otherwise, is great, but nothing to the Profit. But the *English Tobacco*, hath small credit, as being too *Dull*, and *Earthy*: Nay the *Virginian Tobacco*, though that be in a *Hotter Climate*, can get no credit, for the same Cause: So that

X

a Triall

Experiment
Solitary, touching the
Comparative
Magnitude of
Living Creatures.

853

Experiment
Solitary, touching
Exhaustion of Fruits.

854

Experiment
Solitary, touching the
Melioration of Tobacco.

855

a Triall to make Tobacco more *Aromaticall*, and better Concocted here in *England*, where a Thing of great profit. Some have gone about to doe it by Drenching the *English Tobacco*, in a Decoction or Infusion of *Indian Tobacco*: But those are but Sophistications, and Toyes; For Nothing that is once Perfect, and hath run his Race, can receive much Amendment. You must ever resort to the Beginnings of Things for *Melioration*. The Way of *Maturation* of Tobacco must, as in other Plants, be, from the Heat, Either of the *Earth*, or of the *Sunne*: We see some Leading of this in Musk-Melons; which are sown upon a *Hot Bed*, Dunged below, upon a Banke turned upon the *South Sunne*, to give Heat by *Reflexion*; Laid upon *Tiles*, which increaseth the Heat; And Covered with *Straw* to keepe them from *Cold*. They remove them also, which addeth some *Life*: And by these Helps they become as good in *England*, as in *Italy*, or *Provence*. These, and the like Meanes, may be tried in Tobacco. Enquire also of the *Steeping* of the *Roots*, in some such *Liquour*, as may give them Vigour to put forth Strong.

Experiment
Solitary, touching severall
Heats, working
the same Effects.

856

Heat of the *Sunne*, for the *Maturation* of *Fruits*; Yea and the Heat of *Vivification* of *Living Creatures*; are both represented and supplied, by the Heat of *Fire*; And likewise, the Heats of the *Sunne*, and *Life*, are represented one by the other. *Trees*, set upon the *Banks* of *Chimneys*, doe ripen *Fruit* sooner. *Vines*, that have beene drawne in at the Window of a *Kitchen*, have sent forth *Grapes* ripe a Moneth (at least) before others. *Stoves*, at the Backe of Walls, bring forth *Oranges* here with us. *Egges*, as is reported by some, have beene hatched in the warmth of an *Oven*. It is reported by the *Ancients*, that the *Estrich* Layeth her *Egges* under *Sand*, where the Heat of the *Sunne* discloseth them.

Experiment
Solitary, touching Swelling
and Dilatation
in Boiling.

857

Barley in the Boiling swelleth not much; *Wheat* swelleth more; *Rize* extremely; In so much as a Quarter of a Pint (unboyled) will arise to a Pint boyled. The Cause (no doubt) is, for that the more Close and Compact the *Body* is, the more it will dilate: Now *Barley* is the most Hollow; *Wheat* more Solide than that; and *Rize* most Solide of all. It may be also that some *Bodies* have a Kinde of *Lentour*, and more *Depertible Nature* than others; As we see it Evident in *Colouration*; For a Small *Quantitie* of *Saffron*, will Tinct more, than a verie great *Quantitie* of *Bresill*, or *Wine*.

Experiment
Solitary, touching the Dul-
coration of
Fruits.

858

Fruit groweth Sweet by Rowling, or Pressing them gently with the Hand; As Rowling-Peares, *Damascins*, &c. By Rottenesse; As *Medlars*, *Services*, *Sloe's*, *Heps*, &c. By Time; As *Apples*, *Wardens*, *Pomgranats*, &c. By certaine Speciall *Maturations*; As by Laying them in *Hay*, *Straw*, &c. And by *Fire*; As in *Roasting*, *Stewing*, *Baking*, &c. The Cause of the Sweetnesse by Rowling, and Pressing, is *Emolition*, which they properly enduce; As in Beating of *Stock-Fish*, *Flesh*, &c. By Rottenesse is, for that the *Spirits* of the *Fruit*, by *Putrefaction*, gather Heat, and thereby digest the

the Harder Part: For in all *Putrefactions*, there is a *Degree of Heat*. By *Time* and *Keeping* is, because the *Spirits* of the *Body*, doe ever feed upon the *Tangible Parts*, and attenuate them. By *Severall Maturations* is, by some *Degree of Heat*. And by *Fire* is, because it is the Proper Worke of *Heat* to *Refine*, and to *Incorporate*; And all *Sourness* consisteth in some *Grossness* of the *Body*: And all *Incorporation* doth make the *Mixture* of the *Body*, more *Equall*, in all the *Parts*; Which ever induceth a *Milder Taste*.

OF *Fleshes*, some are *Edible*; Some, except it be in *Famine*, not. For those that are not *Edible*, the *Cause* is, for that they have (commonly) too much *Bitterness* of *Taste*; And therefore those *Creatures*, which are *Fierce* and *Cholerick*, are not *Edible*; As *Lions*, *Wolves*, *Squirrells*, *Dogs*, *Foxes*, *Horses*, &c. As for *Kine*, *Sheepe*, *Goats*, *Deere*, *Swine*, *Conneyes*, *Hares*, &c. We see they are *Milde* and *Fearfull*. Yet it is true, that *Horses*, which are *Beasts* of *Courage*, have beene, and are eaten by some *Nations*; As the *Scythians* were called *Hippophagi*; And the *Chineses* eat *Horse-flesh* at this day; And some *Gluttons* have used to haue *Colts-flesh* baked. In *Birds*, such as are *Carnivora*, and *Birds of Prey*, are commonly no *Good Meat*; But the *Reason* is, rather the *Cholerick Nature* of those *Birds*, than their *Feeding* upon *Flesh*; For *Puirs*, *Gulls*, *Shovelers*, *Ducks*, doe feed upon *Flesh*, and yet are good *Meat*: And wee see, that those *Birds*, which are of *Prey*, or feed upon *Flesh*, are good *Meat*, when they are verie *Young*; As *Hawkes*, *Rookes* out of the *Nest*, *Owles*, &c. *Mans Flesh* is not *Eaten*. The *Reasons* are *Three*: First, because *Men* in *Humanitie* doe abhorre it: Secondly, because no *Living Creature*, that *Dyeth* of it selfe, is good to *Eat*: And therefore the *Caniballs* (themselves) eat no *Mans-flesh*, of those that *Dye* of *Themselves*, but of such as are *Slaine*. The Third is, because there must be (generally) some *Disparitie*, between the *Nourishment*, and the *Body Nourished*; And they must not be *Over-neere*, or like: yet we see, that in great *Weaknesses*, and *Consumptions*, *Men* have beene sustained with *Womans Milke*: And *Ficinus* fondly (as I conceive) adviseth, for the *Prolongation* of *Life*, that a *Veine* be opened in the *Arme* of some wholesome *Young Man*; And the *Bloud* to be sucked. It is said, that *Witches* doe greedily eat *Mans flesh*; which if it be true, besides a *Diabolish Appetite* in them, it is likely to proceed, for that *Mans flesh* may send up *High* and *Pleasing Vapours*, which may stirre the *Imagination*; And *Witches Felicitie* is chiefly in *Imagination*, as hath beene said.

THere is an *Ancient Received Tradition* of the *Salamander*, that it liveth in the *Fire*, and hath force also to extinguish the *Fire*. It must have two Things, if it be true, to this *Operation*: The One a verie *Close Skin*, whereby *Flame*, which in the *Midst* is not so hot, cannot enter: For we see that if the *Palme* of the *Hand* be annointed thicke with *White of Egge*, and then *Aquavita* be poured upon it, and *Enflamed*, yet one may endure the *Flame* a prettie while. The other is some *Extreme Cold* and

Experiment
Solitary, touching
Flesh
Edible, and
not Edible.

859

Experiment
Solitary, touching
Flesh
Edible, and
not Edible.

858

Experiment
Solitary, touching
Flesh
Edible, and
not Edible.

858

Experiment
Solitary, touching
the Sa-
lamander.

860

Quenching vertue, in the *Body* of the *Creature*, which choaketh the *Fire*. We see that *Milke* quencheth *wilde-Fire*, better than *Water*, because it entreth better.

Experiment
Solitary, touch-
ing the Con-
trarie Operati-
ons of Time,
upon Fruits,
and Liqueurs.

861

Time doth change *Fruit*, (as *Apples*, *Pears*, *Pomgranats*, &c) from more *Soure*, to more *Sweet*: But contrariwise *Liqueurs*, (even those that are of the *Juyce* of *Fruit*,) from more *Sweet* to more *Soure*; As *Wort*, *Must*, *New Verjuice*, &c. The *Cause* is, the *Congregation* of the *Spirits* together: For in both *Kindes*, the *Spirit* is attenuated by *Time*; But in the first *Kinde*, it is more *Diffused*, and more *Mastered* by the *Grosser Parts*, which the *Spirits* doe but digest: But in *Drinks* the *Spirits* doe reigne, and finding lesse *Opposition* of the *Parts*, become themselves more *Strong*; Which causeth also more *Strength* in the *Liquour*; Such, as if the *Spirits* be of the *Hotter Sort*, the *Liquour* becommeth apt to *Burne*; But in *Time*, it causeth likewise, when the *Higher Spirits* are *Evapourated*, more *Sourenesse*.

Experiment
Solitary, touch-
ing *Blowes*
and *Bruises*.

862

It hath beene observed by the *Ancients*, that *Plates* of *Metall*, and especially of *Brasse*, applied presently to a *Blow*, will keepe it downe from *Swelling*. The *Cause* is *Repercussion*, without *Humectation*, or *Entrance* of any *Body*: for the *Plate* hath onely a *Virtuall Cold*, which doth not search into the *Hurt*; Whereas all *Plasters* and *Ointments* doe enter. Surely, the *Cause*, that *Blowes* and *Bruises* enduce *Swellings* is, for that the *Spirits* resorting to Succour the *Part* that Laboureth, draw also the *Humours* with them: For we see, that it is not the *Repulse*, and the *Returne* of the *Humour* in the *Part Strucken*, that causeth it; For that *Gouts*, and *Tooth-Aches* cause *Swelling*, where there is no *Percussion* at all.

Experiment
Solitary, touch-
ing the *Orris*
Root.

863

The *Nature* of the *Orris Root*, is almost *Singular*; For there be few *Oderiferous Roots*; And in those that are, in any degree, *Sweet*, it is but the same *Sweetnesse* with the *Wood*, or *Leafe*: But the *Orris* is not *Sweet* in the *Leafe*; Neither is the *Flower* any thing so *Sweet* as the *Root*. The *Root* seemeth to have a *Tender daintie Heat*; Which when it cometh above *Ground*, to the *sunne*, and the *Aire*, vanisheth: For it is a great *Mollifier*; And hath a *Smell* like a *Violet*.

Experiment
Solitary, touch-
ing the Com-
pression of *Liquours*.

864

It hath been observed by the *Ancients*, that a great *Vessell* full, drawne into *Bottles*; And then the *Liquour* put againe into the *Vessell*; will not fill the *Vessell* againe, so full as it was, but that it may take in more *Liquour*: And that this holdeth more in *Wine*, than in *Water*. The *Cause* may be *Triviall*; Namely, by the *Expence* of the *Liquour*, in regard some may sticke to the *Sides* of the *Bottles*: But there may be a *Cause* more *Subtill*; Which is, that the *Liquour* in the *Vessell*, is not so much *Compressed*, as in the *Bottle*; Because in the *Vessell*, the *Liquour* meeteth with *Liquour* chiefly; But in the *Bottles* a *Small Quantitie* of *Liquour*, meeteth

teth with the Sides of the *Bottles*, which Compresse it so, that it doth not Open againe.

Water, being contiguous with *Aire*, Coolerh it, but Moisteneh it not, except it *Vapour*. The Cause is, for that *Heat* and *Cold* have a *Virtuall Transition*, without *Communication of Substance*; but *Moisture* not: And to all *Madefaction* there is required an *Imbibition*: But where the *Bodies* are of such severall *Levitie*, and *Gravitie*, as they Mingle not, there can follow no *Imbibition*. And therefore, *Oyle* likewise lyeth at the *Top* of the *Water*, without *Commixture*: And a *Drop* of *Water*, running swiftly over a *Straw*, or *Smooth Body*, wetteh not.

Experiment
Solitary, touching the Working of Water upon Aire
Contiguous.

865

178

Starre-light Nights, yea and bright *Moone shine* Nights, are *Colder* than *Cloudy* Nights. The Cause is, the *Drinnesse* and *Finenesse* of the *Aire*, which thereby becommeth more *Piercing*, and *Sharp*: And therefore *Great Continents* are colder than *Islands*: And as for the *Moone*, though it selfe inclineth the *Aire* to *Moisture*, yet when it shineth bright, it argueth the *Aire* is dry. Also *Close Aire* is warmer than *Open Aire*; which (it may be) is, for that the true Cause of *Cold*, is an *Expiration* from the *Globe* of the *Earth*, which in open *Places* is stronger; And againe, *Aire* it selfe, if it be not altered by that *Expiration*, is not without some *Secret Degree* of *Heat*: As it is not likewise without some *Secret Degree* of *Light*: For otherwise *Cats*, and *Owles*, could not see in the *Night*; But that *Aire* hath a little *Light*, *Proportionable* to the *Visuall Spirits* of those *Creatures*.

Experiment
Solitary, touching the Nature of Aire.

866

The *Eyes* doe move one and the same way; For when one *Eye* moveth to the *Noshrill*, the other moveth from the *Noshrill*. The Cause is *Motion of Consent*, which in the *Spirits*, and *Parts Spirituall*, is Strong. But yet *Use* will induce the Contrarie: For some can *Squint*, when they will: And the *Common Tradition* is, that if *Children* be set upon a *Table*, with a *Candle* behinde them, both *Eyes* will move *Outwards*; As affecting to see the *Light*, and so induce *Squinting*.

Experiments
in Confort touching the Eyes and Sight.

867

We see more exquisitely with *One Eye Shut*, than with *Both Open*. The Cause is, for that the *Spirits Visuall* unite themselves more, and so become Stronger. For you may see, by looking in a *Glasse*, that when you shut one *Eye*, the *Pupill* of the other *Eye*, that is *Open*, Dilateth.

868

The *Eyes*, if the *Sight* meet not in one *Angle*, See Things Double. The Cause is, for that Seeing two Things, and Seeing one Thing twice, worketh the same Effect: And therefore a little *Pellet*, held betweene two *Fingers*, laid a crosse, seemeth Double.

869

Pore-blinde Men, see best in the *Dimmer Light*; And likewise have their *Sight* Stronger neere hand, than those that are not *Pore-blinde*; And can *Reade* and *Write* smaller *Letters*. The Cause is, for that the *Spirits Visuall*, in those that are *Pore-blinde*, are Thinner, and Rarer, than in others; And therefore the Greater *Light* disperseth them. For the same

870

Cause they need Contracting; But being Contracted, are more strong, than the *Visuall Spirits* of Ordinarie *Eyes* are; As when we see thorow a *Levell*, the *Sight* is the Stronger: And so is it, when you gather the *Eye-lids* somewhat close: And it is commonly seene in those that are *Pore-blinde*, that they doe much gather the *Eye-lids* together. But *Old Men*, when they would see to Read, put the Paper somewhat a farre off. The Cause is, for that *Old Mens Spirits Visuall*, contrarie to those of *Pore-blinde Men*, unite not, but when the *Object* is at some good distance, from their *Eyes*.

871

Men see better, when their *Eyes* are over-against the *Sunne*, or a *Candle*, if thy put their *Hand* a little before their *Eye*. The Reason is, for that the *Glaring* of the *Sunne*, or the *Candle*, doth weaken the *Eye*; whereas the *Light Circumfused* is enough for the *Perception*. For wee see, that an *Over-light* maketh the *Eyes* Dazell; Insomuch as Perpetuall Looking against the *Sunne*, would Cause *Blindnesse*. Againe, if *Men* come out of a *Great Light*, into a *Darke Roome*; And contrariwise, if they come out of a *Darke Roome*, into a *Light Roome*, they seeme to have a *Mist* before their *Eyes*, and see worse, than they shall doe, after they have staid a little while, either in the *Light*, or in the *Darke*. The Cause is, for that the *Spirits Visuall*, are upon a Sudden Change, disturbed, and put out of Order; And till they be recollected, doe not performe their Function well. For when they are much Dilated by *Light*, they cannot Contract suddenly; And when they are much Contracted by *Darknesse*, they cannot Dilate suddenly. And Excesse of both these, (that is, of the *Dilatation*, and *Contraction* of the *Spirits Visuall*;) if it be long, Destroyeth the *Eye*. For as long Looking against the *Sunne*, or *Fire*, hurterh the *Eye* by *Dilatation*; So *Curious Painting* in *Small Volumes*, and *Reading* of *Small Letters*, doe hurt the *Eye* by *Contraction*.

872

It hath beene observed, that in *Anger*, the *Eyes* wax *Red*; And in *Blushing*, not the *Eyes*, but the *Eares*, and the *Parts* behinde them. The Cause is, for that in *Anger*, the *Spirits* ascend and wax Eager; Which is most easily seene in the *Eyes*, because they are Translucide; Though withall it maketh both the *Cheekes*, and the *Gills* *Red*; But in *Blushing*, it is true, the *Spirits* ascend likewise to Succour, both the *Eyes*, and the *Face*, which are the *Parts* that labour: But then they are repulsed by the *Eyes*, for that the *Eyes*, in Shame doe put backe the *Spirits*, that ascend to them, as unwilling to looke abroad: For no *Man*, in that *Passion*, doth looke strongly, but Dejectedly; And that *Repulsion* from the *Eyes*, Diverteth the *Spirits* and *Heat* more to the *Eares*, and the *Parts* by them.

873

The *Objects* of the *Sight*, may cause a great *Pleasure* and *Delight* in the *Spirits*, but no *Paine*, or great *Offence*, Except it be by *Memory*, as hath beene said. The *Glimpses* and *Beames* of *Diamonds* that strike the *Eye*; *Indian Beathers*, that have glorious Colours; The *Comming* into a *Faire Garden*; The *Comming* into a *Faire Roome* richly furnished; A *Beautiful Person*; And the like; doe delight and exhilarate the *Spirits* much. The Reason.

Reason, why it holdeth not in the *Offence*, is, for that the *Sight* is the most *Spiritual* of the *Senses*; whereby it hath no *Object* *Grosse* enough to offend it. But the *Cause* (chiefly) is, for that there be no *Active Objects* to offend the *Eye*. For *Harmonicall Sounds*, and *Discordant Sounds*, are both *Active*, and *Positive*: So are *Sweet Smells*, and *Stinks*: So are *Bitter*, and *Sweet*, in *Tastes*: So are *Over-Hot*, and *Over-Cold*, in *Touch*: But *Blacknesse*, and *Darknesse*, are indeed but *Privatives*; And therefore have little or no *Activitie*. Somewhat they doe *Contristate*, but verie little.

Water of the *Sea*, or otherwise, looketh *Blacker* when it is moved, and *Whiter* when it resteth. The *Cause* is, for that by meanes of the *Motion*, the *Beames* of light passe not *Straight*, and therefore must be darkened; whereas, when it resteth, the *Beames* doe passe *Straight*. Besides, *Splendour* hath a *Degree* of *Whitenesse*; Especially if there be a little *Repercussion*: For a *Looking-Glasse* with the *Speele* behinde, looketh *Whiter*, than *Glasse Simple*. This *Experiment* deserveth to be driven further, in *Trying* by what *Meanes Motion* may hinder *Sight*.

Experiment
Solitary, touching the
Colour of the Sea,
or other water.
874

Shell-Fish have beene, by some of the *Ancients*, compared and sorted with the *Insecta*; But I see no reason why they should; For they have *Male*, and *Female*, as other *Fish* have: Neither are they bred of *Pu-
trification*; Especially such as doe *Move*. Neverthelesse it is certaine, that *Oysters*, and *Cockles*, and *Mussels*, which *Move* not, have not discriminate *Sex*: *Quare* in what time, and how they are bred? It seemeth that *Shells* of *Oysters* are bred where none were before; And it is tried, that the great *Horse-Mussle*, with the fine shell, that breedeth in *Ponds*, hath bred within thirtie yeares: But then, which is strange, it hath been tried, that they doe not only *Gape*, and *Shut*, as the *Oysters* doe, but *Re-
move* from one Place to Another.

Experiment
Solitary, touching
Shell-
Fish.
875

The *Senses* are alike *Strong*, both on the *Right Side*, and on the *Left*; But the *Limmes* on the *Right Side* are *Stronger*. The *Cause* may be, for that the *Braine*, which is the *Instrument* of *Sense*, is alike on both *Sides*; But *Motion*, and *Habilities* of *Moving*, are somewhat holpen from the *Liver*, which lieth on the *Right Side*. It may be also, for that the *Senses* are put in *Exercise*, indifferently, on both *Sides*, from the *Time* of our *Birth*; But the *Limmes* are used most on the *Right Side*, whereby *Custom* helpeth; For we see that some are *Left-Handed*: Which are such, as have used the *Left-Hand* most.

Experiment
Solitary, touching the
Right Side, and
the Left.
876

Fricions make the *Parts* more *Fleshie*, and *Full*: As we see both in *Men*; And in *Currying* of *Horses*, &c. The *Cause* is, for that they draw greater *Quantitie* of *Spirits* and *Bloud* to the *Parts*: And againe, because they draw the *Aliment* more forcibly from within: And againe, because they relax the *Pores*, and so make better *Passage* for the *Spirits*, *Bloud*, and *Aliment*: Lastly, because they dissipate and digest any *Inutile* or *Ex-
crementitious*

Experiment
Solitary touching
Fric-
tions.
877

cremētious Moisture, which lieth in the *Flesh*: All which help *Assimilation*. *Frictions* also doe more *Fill*, and *Impinguate* the *Body*, than *Exercise*. The *Cause* is, for that in *Frictions*, the *Inward Parts* are at rest; Which in *Exercise* are beaten (many times) too much: And for the same Reason, (as we have noted heretofore,) *Gally-Slaves* are *Fat* and *Fleshy*, because they stirre the *Limmes* more, and the *Inward Parts* lesse.

Experiment
Solitary tou-
ching Globes
appearing Flat
at Distance.

878

ALL Globes as farre off appeare *Flat*. The *Cause* is, for that *Distance*, being a *Secundarie Object* of *Sight*, is not otherwise discerned, than by more or lesse *Light*; which *Disparitie* when it cannot be discerned, all seemeth *One*: As it is (generally) in *Objects* not distinctly discerned; For so *Letters*, if they be so farre off, as they cannot be discerned, shew but as a *Drunkish Paper*: And all *Engravings*, and *Embossings*, (as farre off) appeare *Plaine*.

Experiment
Solitary, tou-
ching Sha-
dowes.

879

THE *Vichest Parts* of *Shadowes* seeme ever to *Tremble*. The *Cause* is, for that the little *Moats*, which we see in the *Sunne*, doe ever *Stirre*, though there be no *Wind*; And therefore those *Moving*, in the *Meeting* of the *Light* and the *Shadow*, from the *Light* to the *Shadow*, and from the *Shadow* to the *Light*, doe shew the *Shadow* to *Move*, because the *Medium* *Moveth*.

Experiment
Solitary, tou-
ching the
Rowling and
Breaking of the
Seas.

880

SHALLOW, and *Narrow Seas*, breake more than *Deepe*, and *Large*. The *Cause* is, for that the *Impulsion* being the same in Both; Where there is greater *Quantitie* of *Water*, and likewise *Space* Enough; there the *Water* *Rowleth*, and *Moveth*, both more *Slowly*, & with a *Sloper Rise*, and *Fall*: But where there is lesse *Water*, and lesse *Space*, and the *Water* dasheth more against the *Bottom*; there it *moveth* more *Swiftly*, and more in *Precipice*; For in the *Breaking* of the *Waves* there is ever a *Precipice*.

Experiment
Solitary, tou-
ching the Dis-
coloration of
Salt-water.

881

IT hath beene observed by the *Ancients*, that *Salt-water* *Boyled*, or *Boyled* and *Cooled* againe, is more *Potable*, than of it selfe *Raw*: And yet the *Taste* of *Salt*, in *Distillations* by *Fire*, riseth not; For the *Distilled Water* will be *Fresh*. The *Cause* may be, for that the *Salt Part* of the *Water*, doth partly rise into a *Kinde* of *Scumme* on the *Top*; And partly goeth into a *Sediment* in the *Bottom*: And so is rather a *Separation*, than an *Evaporation*. But it is too grosse to rise into a *Vapour*: And so is a *Bitter Taste* likewise; For *Simple Distilled Waters*, of *Wormewood*, and the like, are not *Bitter*.

Experiment
Solitary, tou-
ching the Re-
turne of Salt-
nesse in Pits
upon the Sea-
Shore.

882

IT hath beene set downe before, that *Pits* upon the *Sea-Shore*, turne into *Fresh Water*, by *Percolation* of the *Salt* through the *Sand*: But it is further noted, by some of the *Ancients*, that in some *Places* of *Affricke*, after a time, the *Water* in such *Pits* will become *Brackish* againe. The *Cause* is, for that after a time, the verie *Sands*, thorow which the *Salt-Water* passeth, become *Salt*; And so the *Strainer* it selfe is tinged with *Salt*.

Salt. The Remedie therefore is, to digge still *New Pits*, when the old wax *Erackish*; As if you would change your *Strainer*.

IT hath beene observed by the *Ancients*, that *Salt-water*, will dissolve *Salt* put into it, in lesse time, than *Fresh water* will dissolve it. The Cause may be, for that the *Salt* in the *Precedent Water*, doth, by *Similitude of Substance*, draw the *Salt* new put in, unto it; Whereby it diffuseth in the *Liquour* more speedily. This is a Noble *Eperiment*, if it be true; For it sheweth Meanes of more *Quick* and *Easie Infusions*; And it is likewise a good *Instance of Attraction*, by *Similitude of Substance*. Trie it with *Sugar* put into *Water*, formerly *Sugred*; And into other *Water Unsugred*.

Experiment
Solitary, touching
Attraction by Similitude of Substance

883

PUt *Sugar* into *Wine*, part of it above, part under the *Wine*; And you shal finde, (that which may seem strange,) that the *Sugar* above the *Wine*, will soften and dissolve sooner, than that within the *Wine*. The Cause is, for that the *Wine* entreth that Part of the *Sugar*, which is under the *Wine*, by Simple *Infusion*, or *Spreading*; But that Part above the *Wine*, is likewise forced by *Sucking*; For all *Spungie Bodies* expell the *Aire*, and draw in *Liquour*, if it be *Contiguous*: As wee see it also in *Spunges*, put part above the *Water*. It is worthy the *Inquirie*, to see how you may make more *Accurate Infusions*, by Help of *Attraction*.

Experiment
Solitary, touching
Attraction

884

WATER in *Wells* is warmer in *Winter*, than in *Summer*: And so *Aire* in *Caves*. The Cause is, for that in the *Hither Parts*, under the *Earth*, there is a *Degree* of some *Heat*; (As appeareth in *Sulphureous Veines*, &c.) Which shut close in, (as in *Winter*,) is the More; But if it *Perspire*, (as it doth in *Summer*,) it is the lesse.

Experiment
Solitary, touching
Heat under Earth.

885

IT is reported, that amongst the *Leucadians*, in *Ancient* time, upon a *Superstition*, they did use to *Precipitate* a *Man*, from a *High Cliffe* into the *Sea*; Tying about him, with *Strings*, at some distance, many great *Fowles*; And fixing unto his *Body* divers *Feathers*, spred, to breake the *Fall*. Certainly many *Birds* of good *Wing*, (As *Kites*, and the like,) would beare up a good *Weight*, as they flie; And *Spreading* of *Feathers*, thinne, and close, and in great *Bredth*, will likewise beare up a great *Weight*; Being even laid, without *Tilting* upon the *Sides*. The further *Extension* of this *Experiment* for *Flying* may be thought upon.

Experiment
Solitary, touching
Flying in the Aire.

886

THERE is, in some Places, (namely in *Cephalonia*,) a little *Shrub*, which they call *Holy-Oake*, or *Dwarf-Oake*: Upon the *Leaves* whereof there riseth a *Tumour*, like a *Blistre*; Which they gather, and rub out of it, a certaine *Red Dust*, that converteth (after a while) into *Wormes*, which they kill with *Wine*, (as is reported,) when they begin to *Quicken*: With this *Dust* they die *Scarlet*.

Experiment
Solitary, touching
the Dye of Scarlet.

887

IN *Zant*, it is verie ordinarie, to make *Men Impotent*, to accompany with

Experiment
Solitary tou-

ching Malef-
ciating.

888

Experiment
Solitary, tou-
ching the Rise
of Water, by
Meanes of
Flame.

889

Experiment
in Confort
touching the
Influences of
the Moone.Experiment
in Confort
touching the
Influences of
the Moone.

888

with their wives. The like is Practised in *Gastonie*; Where it is called *Nouer Equillette*. It is practised alwayes upon the wedding Day. And in *Zant*, the Mothers themselves doe it, by way of Prevention; Because thereby they hinder other *Charmes*, and can undoe their Owne. It is a Thing the *Civill Law* taketh knowledge of; And therefore is of no Light Regard.

IT is a Common Experiment, but the Cause is mistaken. Take a Pot, (Or better a *Glasse*, because therein you may see the Motion,) And set a Candle lighted in the Bottome of a *Bason* of Water; And turne the Mouth of the Pot, or *Glasse*, over the Candle, & it will make the Water rise. They ascribe it, to the Drawing of Heat; Which is not true: For it appeareth plainly to be but a Motion of Nexe, which they call *Ne detur vacuum*; And it proceedeth thus. The Flame of the Candle, as soone as it is covered, being suffocated by the Close Aire, lesseneth by little and little: During which time, there is some little Ascent of Water, but not much: For the Flame Occupying lesse and lesse Roome, as it lesseneth, the Water succeedeth. But upon the Instant of the Candles Going out, there is a sudden Rise, of a great deale of Water; For that the Body of the Flame filleth no more Place; And so the Aire, and the Water succeed. It worketh the same Effect, if in stead of Water, you put Flower, or Sand, into the *Bason*: Which sheweth, that it is not the Flames Drawing the Liqueur, as *Nourishment*; As it is supposed; For all Bodies are alike unto it; As it is ever in Motion of Nexe; Insomuch as I have seene the *Glasse*, being held by the Hand, hath lifted up the *Bason*, and all: The Motion of Nexe did so Clasp the Bottome of the *Bason*. That Experiment, when the *Bason* was lifted up, was made with Oyle, and not with Water: Nevertheless this is true, that at the verie first Setting of the Mouth of the *Glasse*, upon the Bottome of the *Bason*, it draweth up the Water a little, and then standeth at a Stay, almost till the Candles Going out, as was said. This may shew some Attraction at first: But of this we will speake more, when we handle Attractions by Heat.

Of the Power of the Celestiall Bodies, and what more Secret Influences they have, besides the two Manifest Influences of Heat, and Light, We shall speake, when we handle Experiments touching the Celestiall Bodies: Meane-while, wee will give some Directions for more certaine Trials, of the Vertue and Influences of the Moone; which is our Neerest Neighbour.

The Influences of the Moone, (most observed,) are Four. The Drawing forth of Heat: The Inducing of Putrefaction: The Increase of Moisture: The Exciting of the Motions of Spirits.

For

For the *Drawing forth* of *Heat*, wee have formerly prescribed, to take *Water Warne*, and to set Part of it against the *Moone-Beames*, and Part of it with a *Skreen* between; And to see whether that which standeth *Exposed* to the *Beames*, will not *Cool* sooner. But because this is but a *Small Interposition*, (though in the *Sunne* wee see a *Small Shade* doth much,) it were good to trie it, when the *Moone* shineth, and when the *Moone* shineth not at all; And with *Water Warne* in a *Glasse-Bottle*, as well as in a *Disb*; And with *Cinders*; And with *Iron Red-Hot*; &c.

890

For the *Inducing* of *Putrefaction*, it were good to trie it with *Flesh*, or *Fish*, *Exposed* to the *Moone-Beames*; And againe *Exposed* to the *Aire*, when the *Moone* shineth not, for the like time; To see whether will corrupt sooner: And trie it also with *Capon*, or some other *Fowle*, laid abroad, to see whether it will mortifie, and become tender sooner? Trie it also with *Dead Flies*, or *Dead Wormes*, having a little *Water* cast upon them, to see whether will *Putrifie* sooner. Trie it also with an *Apple*, or *Orenge*, having *Holes* made in their *Tops*, to see whether will *Rot* or *Mould* sooner? Trie it also with *Holland-Cheese*, having *Wine* put into it, whether will breed *Mites* sooner, or greater?

891

For the *Increase* of *Moisture*, the Opinion Received is; That *Seeds* will grow soonest; And *Haire*, and *Nails*, and *Hedges*, and *Herbs*, *Cut*, &c. will grow soonest, if they be *Set*, or *Cut*, in the *Increase* of the *Moone*. Also that *Brains* in *Rabits*, *Wood-cocks*, *Calves*, &c. are fullest in the *Full* of the *Moone*: And so of *Marrow* in the *Bones*; And so of *Oysters*, and *Cockles*, which of all the rest are the easiest tried, if you have them in *Pits*.

892

Take some *Seeds*, or *Roots*, (as *Onions*, &c.) and set some of them immediately after the *Change*; And others of the same kinde immediately after the *Full*: Let them be as Like as can be: The *Earth* also the Same as neere as may be; And therefore best in *Pots*: Let the *Pots* also stand, where no *Raine*, or *Sunne* may come to them, lest the *Difference* of the *Weather* confound the *Experiment*: And then see in what *Time*, the *Seeds* *Set* in the *Increase* of the *Moone*, come to a certaine *Height*; And how they differ from those that are *Set* in the *Decrease* of the *Moone*.

893

It is like, that the *Braine* of *Man* waxeth *Moister*, and *Fuller*, upon the *Full* of the *Moone*: And therefore it were good for those that have *Moist Brains*, and are great *Drinkers*, to take *Fume* of *Lignum Aloe*, *Rose-Mary*, *Frankincense*, &c. about the full of the *Moone*. It is like also, that the *Humours* in *Mens Bodies*, *Increase*, and *Decrease*, as the *Moone* doth; And therefore it were good to *Purge*, some day, or two, after the *Full*; For that then the *Humours* will not replenish so soone againe.

894

As for the *Exciting* of the *Motion* of the *Spirits*, you must note that the *Growth* of *Hedges*, *Herbs*, *Haire*, &c. is caused from the *Moone*, by *Exciting* of the *Spirits*, as well as by *Increase* of the *Moisture*. But for *Spirits* in particular, the great *Instance* is in *Lunaries*.

895

There may be other *Secret Effects* of the *Influence* of the *Moone*, which are not yet brought into *Observation*. It may be, that if it so fall out,

896

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out, that the *wind* be North, or North-East, in the Full of the *Moone*, it increaseth Cold; And if South, or South West, it disposeth the *Aire*, for a good while, to *Warmth*, and *Raine*; Which would be observed.

It may be, that *Children*, and *Young Catell*, that are Brought forth in the Full of the *Moone*, are stronger, & larger, than those that are brought forth in the *Wane*: And thole also which are Begotten in the Full of the *Moone*: So that it might be good *Husbandrie*, to put *Rams*, and *Bulls* to their *Females*, somewhat before the Full of the *Moone*. It may be also, that the *Egg* lay'd in the Full of the *Moone*, breed the better *Bird*: And a Number of the like *Effects*, which may be brought into *Observation*: *Quere* also, whether great *Thunders*, and *Earth Quakes*, be not most in the Full of the *Moone*.

Experiment
Solitary, touch-
ing *Vinegar*.

898

THE Turning of *Wine* to *Vinegar*, is a Kinde of *Putrefaction*: And in Making of *Vinegar*, they use to set *Vessels* of *Wine* over against the *Noone-Sunne*; which calleth out the more *Volyle Spirits*, and leaveth the *Liquour* more *Soure*, and *Hard*. Wee see also, that *Burnt-Wine* is more *Hard*, and *Astringent*, than *Wine Vnburnt*. It is said that *Cider* in *Navigations* under the *Line* ripeneth, when *Wine* or *Beere* sowreth. It were good to set a *Rundlet* of *Verjuice* over against the *Sunne*, in *Summer*, as they doe *Vinegar*, to see whether it will *Ripen*, and *Sweeten*.

Experiment
Solitary, touch-
ing *Crea-
tures* that
Sleepe all *win-
ter*.

899

THERE be divers *Creatures*, that *Sleepe* all *Winter*; As the *Bears*, the *Hedge-hog*, the *Bar*, the *Bee*, &c. These all wax *Fat* when they *Sleepe*, and egest not. The Cause of their *Fattening*, during their *Sleeping time*, may be the want of *Assimilating*; For whatsoever *Assimilate*th not to *Flesh*, turneth either to *Sweat*, or *Fat*. These *Creatures*, for part of their *Sleeping Time*, have beene observed not to *Stirre* at all; And for the other part, to *Stirre*, but not to *Remove*. And they get *Warne* and *Closte Places* to *Sleepe* in. When the *Flemmings* Wintred in *Nova Zembla*, the *Bears*, about the Middle of *November*, went to *Sleepe*; And then the *Foxes* began to come forth, which durst not before. It is noted by some of the *Ancients*, that the *Shee-Bear* breedeth, and lyeth in with her *Young*, during that time of *Rest*: And that a *Bear*, Big with *Young*, hath feldome beene scene.

Experiment
Solitary, touch-
ing the *Ge-
neration* of
Creatures by
Copulation, and
by *Putrefa-
ction*.

900

SOME *Living Creatures* are Procreated by *Copulation* betweene *Male*, and *Female*: Some by *Putrefaction*; And of those which come by *Putrefaction*, many doe (neverthelesse) afterwards procreate by *Copulation*. For the Cause of both *Generations*: First, it is most certaine, that the Cause of all *Vivification*, is a *Gentle* and *Proportionable Heat*, working upon a *Glutinous* and *Teelding Substance*: For the *Heat* doth bring forth *Spirit* in that *Substance*: And the *Substance*, being *Glutinous*, produceth Two *Effects*: The One, that the *Spirit* is *Detained*, and cannot *Breake forth*: The Other, that the *Matter* being *Gentle*, and *Teelding*, is driven forwards by the *Motion* of the *Spirits*, after some *Swelling* into *Shape*, and *Members*. There-

Therefore all *Sperme*, all *Menstruous Substance*, all *Matter* whereof *Creatures* are produced by *Putrefaction*, have evermore a *Closeness*, *Lentour*, and *Sequelitie*. It seemeth therefore, that the *Generation* by *Sperme* only, and by *Putrefaction*, have two *Different Causes*. The first is, for that *Creatures*, which have a *Definite* and *Exact Shape*, (as those have which are Procreated by *Copulation*;) cannot be produced by a *Weake*, and *Casual Heat*; Nor out of *Matter*, which is not *exactly Prepared*, according to the *Species*. The Second is, for that there is a greater *Time* required, for *Maturation* of *Perfect Creatures*; For if the *Time* required in *Vivification* be of any length, then the *Spirit* will *Exhale*, before the *Creature* be *Mature*: Except it be *Enclosed* in a *Place* where it may have *Continuance* of the *Heat*, *Access* of some *Nourishment* to maintaine it, and *Closeness* that may keepe it from *Exhaling*. And such *Places* are the *Wombs*, and *Matrices*, of the *Females*. And therefore all *Creatures*, made of *Putrefaction*, are of more *Uncertaine Shape*; And are made in *Shorter Time*; And need not so *Perfect* an *Enclosure*, though some *Closeness* be commonly required. As for the *Heathen Opinion*, which was, that upon great *Mutations* of the *World*, *Perfect Creatures* were first Engendred of *Concretion*; As well as *Frogs*, and *Wormes*, and *Flies*, and such like, are now; Wee know it to be vaine: But if any such Thing should be admitted, *Discouraging* according to *Sense*, it cannot be, except you admit of a *Chaos* first, and *Commixture* of *Heaven* and *Earth*. For the *Frame* of the *World* once in *Order*, cannot effect it by any *Excesse*, or *Casualtie*.

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counting according to stage, it cannot be, except you admit of a
know it to be vain: But if any look I think should be admitted. Di-
As well as trees, and flowers, and birds, and such like, are now; Wee
of the world, Pagan Germans were first Engendered of Conception;
danced. As for the German Opines which was that upon great trees
ought to be set in evidence, though some call it a weed commonly
are erect more than any shape; And are made in short time. And
of the flowers. And therefore all Germans, made of a weed.
It may keep it from Exhalation. And such place are the Woods, and
of the Heat. Kinds of some newness want to maintain it, and cleanse
itself; Exports be collected in a place where it may have Continuance
of a length, then the steam will Exhale, before the steam be
in a manner of perfect cream; For if the time required in the steam
in the steam. The second is, for that there is a great time required,
that heat: Nor one of them, which is necessarily required, according
is illustrated by comparison, cannot be produced by a Kettle, and a Ca-
lender, which have a defect, and Exhale, (as those have which
body, Pans, have two distinct causes. The first is, for that
and steam, it is much therefore, at the German by Steam only,
it was produced by Pans, have a defect, and Exhale, (as those have which
it is illustrated by comparison, cannot be produced by a Kettle, and a Ca-
lender: Nor one of them, which is necessarily required, according
in the steam. The second is, for that there is a great time required,
in a manner of perfect cream; For if the time required in the steam
in the steam. The second is, for that there is a great time required,
that heat: Nor one of them, which is necessarily required, according
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lender: Nor one of them, which is necessarily required, according
in the steam. The second is, for that there is a great time required,
in a manner of perfect cream; For if the time required in the steam
in the steam. The second is, for that there is a great time required,



NATVRALL HISTORIE.

X. Century.



The Philosophie of Pythagoras, (which was full of Superstition,) did first plant a *Monstrous Imagination*, Which afterwards was, by the Schoole of Plato, and Others, Watred, and Nourished: It was, that the *World* was *One, Entire, Perfect, Living Creature*; Infomuch as *Apollonius of Tyana*, a *Pythagorean Prophet*, affirmed, that the *Ebbing and Flowing* of the *Sea*, was the *Respiration* of the *World*, drawing in *Water* as *Breath*, and putting it forth againe. They went on, and inferred; That if the *World* were a *Living Creature*, it had a *Soule*, and *Spirit*; Which also they held, calling it *Spiritus Mundi*; The *Spirit* or *Soule* of the *World*: By which they did not intend *God*; (for they did admit of a *Deitie* besides;) But

Experiments
in Consort
touching the
Transmission,
and *Influx*, of
Immaterial
Virtues, and
the *Force* of
Imagination.

only the Soule, or Essentiall Forme of the Universe. This Foundation being laid, they mought build upon it, what they would; For in a Living Creature, though never so great, (As for Example, in a great Whale,) the Sense, and the Affects of any one Part of the Body, instantly make a Transcursion thoroughout the whole Body: So that by this they did insinuate, that no Distance of Place, nor Want or Indisposition of Matter, could hinder Magicall Operations; But that, (for Example,) wee mought here in Europe, have Sense and Feeling of that, which was done in China: And likewise, we mought worke any Effect, without, and against Matter: And this, not Holpen by the Cooperation of Angels, or Spirits, but only by the Vnity and Harmonie of Nature. There were some also, that staid not here; but went further, and held; That if the Spirit of Man, (whom they call the Microcosme,) doe give a fit touch to the Spirit of the World, by strong Imaginations, and Beleeves, it might command Nature; For Paracelsus, and some darksome Authors of Magicke, doe ascribe to Imagination Exalted, the Power of Miracle-working Faith. With these Vast and Bottomelesse Follies, Men have been (in part) entertained.

But wee, that hold firme to the Works of God; And to the Sense, which is Gods Lamp; (*Lucerna Dei Spiraculum Hominis*;) will enquire, with all Sobrietie, and Severitie, whether there be to be found, in the Foot-steps of Nature, any such Transmission and Influx of Immateriate Vertues; And what the Force of Imagination is; Either upon the Body Imaginant, or upon another Body: Wherein it will be like that Labour of Hercules, in Purging the Stable of Augeas, to separate from Superstitious, and Magicall Arts, and Observations, any thing that is cleane, and pure Naturall; And not to be either Contemned, or Condemned. And although wee shall ha ve occasion to speake of this in more Places than One, yet we will now make some Entrance thereinto.

Experiments
in Consort,
Monitory, touch-
ing Trans-
mission of Spi-
rits, and the
Force of Im-
agination.

Men are to be Admonished, that they doe not with-draw Credit, from the Operations by Transmission of Spirits, & Force of Imagination, because the Effects faile sometimes. For as in Infection, and Contagion from Body to Body, (as the Plague, and the like,) it is most certaine, that the

the *Infection* is received (many times) by the *Body Passive*, but yet is by the *Strength*, and good *Disposition* thereof, Repulsed, and wrought out, before it formed into a *Disease*; So much more in *Impressions* from *Minde* to *Minde*, or from *Spirit* to *Spirit*, the *Impression* taketh, but is Encountred, and Overcome, by the *Minde* and *Spirit*, which is *Passive*, before it worke any manifest *Effect*. And therefore, they worke most upon *Weake Mindes*, and *Spirits*: As those of *Women*; *Sicke Persons*; *Superstitious*, and *Fearfull Persons*; *Children*, and *Young Creatures*;

Nescio quis teneros Oculis mihi fascinat Agnos:

The Poet speaketh not of *Sheepe*, but of *Lambs*. As for the *Weaknesse* of the *Power* of them, upon *Kings*, and *Magistrates*; It may be ascribed, (besides the maine, which is the *Protection* of *God*, over those that Execute his Place,) to the *Weaknesse* of the *Imagination* of the *Imaginant*: For it is hard, for a *Witch*, or a *Sorcerer*, to put on a Beleeve, that they can hurt such *Persons*.

Men are to be Admonished, on the other side, that they doe not easily give Place and Credit to these *Operations*, because they *Succeed* many times; For the Cause of this *Success*, is (oft) to be truly ascribed, unto the *Force* of *Affection* and *Imagination*, upon the *Body Agent*; And then by a *Secondarie Meanes*, it may worke upon a *Divers Body*: As for Example; If a *Man* carrie a *Planets Seale*, or a *King*, or some *Part* of a *Beast*, beleeving strongly, that it will help him to obtaine his *Love*; Or to keepe him from danger of hurt in *Fight*; Or to prevaile in a *Suit*; &c. it may make him more *Active*, and *Industrious*; And againe, more *Confident*, and *Persisting*, than otherwise he would be. Now the great *Effects* that may come of *Industrie*, and *Perseverance*, (especially in *Civill Businesse*,) who knoweth not? For wee see *Audacitie* doth almost binde and mate the weaker Sort of *Minds*; And the *State* of *Humane Actions* is so variable, that to trie Things oft, and never to give over, doth Wonders: Therefore, it were a Meere *Fallacie* and *Mistaking*, to ascribe that to the *Force* of *Imagination*, upon another *Body*, which is but the *Force* of *Imagination* upon the *Proper Body*: For there is no doubt, but that *Imagination*, and *Veheement Affection*, worke greatly upon the *Body* of the *Imaginant*: As wee shall shew in due place.

Men are to be Admonished, that as they are not to mistake the *Causes* of these *Operations*; So, much lesse, they are to mistake the *Fact*, or *Effect*; And rashly to take that for done, which is not done. And therefore, as divers wise *Judges* have prescribed, and cautioned, Men may not too rashly beleeve, the *Confessions* of *Witches*, nor yet the *Evidence* against them. For the *Witches* themselves are *Imaginative*, and beleeve oft-times, they doe that, which they doe not: And People are *Credulous* in that point, and ready to impute *Accidents*, and *Naturall Operations*, to *Witch-Craft*. It is worthy the Observing, that both in *Ancient*, and *Late times*; (As in the *Thessalian Witches*, and the Meetings of *Witches* that have beene recorded by so many late *Confessions*;) the great Wonders which they tell, of *Carrying* in the *Aire*; *Transforming* themselves into

other Bodies; &c. are still reported to be wrought, not by *Incantations*, or *Ceremonies*; But by *Ointments*, and *Annointing* themselves all over. This may justly move a Man to thinke, that these *Fables* are the *Effects* of *Imagination*: For it is certaine, that *Ointments* doe all, (if they be laid on any thing thicke,) by *Stopping* of the *Pores*, that in the *Vapours*, and send them to the *Head* extremely. And for the *Particular Ingredients* of those *Magick Ointments*, it is like they are *Opiate*, and *Soporiferous*. For *Annointing* of the *Fore-head*, *Necke*, *Feet*, *Back-Bone*; we know is used for *Procuring Dead Sleeper*: And if any Man say, that this *Effect* would be better done by *Inward Potions*; Answer may be made, that the *Medicines*, which goe to the *Ointments*, are so strong, that if they were used inwards, they would kill those that use them: And therefore they worke *Potently*, though *Outwards*.

We will divide the Severall Kindes of the *Operations*, by *Transmission* of *Spirits*, and *Imagination*; Which will give no small Light to the *Experiments* that follow. All *Operations* by *Transmission* of *Spirits*, and *Imagination* have this; That they *Worke at Distance*, and not at *Touch*; And they are these being distinguished.

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The First is the *Transmission* or *Emission*, of the *Thinner*, and more *Airie Parts* of *Bodies*; As in *Odours*, and *Infections*; And this is, of all the rest, the most *Corporeall*. But you must remember withall, that there be a Number of those *Emissions*, both *Wholesome*, and *Unwholesome*, that give no *Smell* at all: For the *Plague*, many times, when it is taken, giveth no *Sent* at all: And there be many *Good* and *Healthfull Aires*, that doe appeare by *Habitation*, and other *Proofes*, that differ not in *Smell* from other *Aires*. And under this Head, you may place all *Imbibitions* of *Aire*, where the *Substance* is *Materiall*, *Odour-like*; Whereof some nevertheless are strange, and verie suddenly diffused; As the *Alteration*, which the *Aire* receiveth in *Egypt*, almost immediately, upon the *Rising* of the *River of Nilus*, whereof we have spoken.

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The Second is the *Transmission* or *Emission* of those *Things* that wee call *Spiritual Species*; As *Visibles*, and *Sounds*: The one whereof wee have handled; And the other we shall handle in due place. These move swiftly, and at great distance; But then they require a *Medium* well disposed; And their *Transmission* is easily stopped.

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The Third is the *Emissions*, which cause *Attraction* of *Certaine Bodies* at *Distance*; Wherein though the *Loadstone* be commonly placed in the *First Ranke*, yet we thinke good to except it, and referre it to another *Head*: but the *Drawing* of *Amber*, and *Iet*, and other *Electricke Bodies*; And the *Attraction* in *Gold* of the *Spirit* of *Quick-Silver*, at distance; And the *Attraction* of *Heat* at distance; And that of *Fire* to *Naphtha*; And that of some *Herbs* to *Water*, though at distance; And divers others; We shall handle, but yet not under this present *Title*, but under the *Title* of *Attraction* in generall.

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The Fourth is the *Emission* of *Spirits*, and *Immaterial Powers* and *Vertues*, in those Things, which worke by the *Universall Configuration*, and *Sympathy* of the *World*; Not by *Formes*, or *Celestiall Influences*, (as is vainly taught and received,) but by the *Primitive Nature* of *Matter*, and the *Seeds of Things*. Of this kinde is, (as we yet suppose,) the *Working* of the *Load-Stone*, which is by *Consent* with the *Globe* of the *Earth*: Of this kinde is the *Motion* of *Gravitie*, which is by *Consent* of *Dense Bodies*, with the *Globe* of the *Earth*: Of this kinde is some *Disposition* of *Bodies* to *Rotation*, and particularly from *East* to *West*: Of which kinde we conceive the *Maine Float* and *Re-float* of the *Seas*, which is by *Consent* of the *Universe*, as Part of the *Diurnall Motion*. These *Immaterial Vertues* have this *Propertie* differing from Others; That the *Diversitie* of the *Medium* hindreth them not; But they passe through all *Mediums*; yet at *Determinate Distances*. And of these wee shall speake, as they are incident to severall *Titles*.

The Fifth is the *Emissions* of *Spirits*; And this is the Principall in our Intention to handle now in this Place: Namely, the *Operation* of the *Spirits* of the *Minde* of *Man*, upon other *Spirits*: And this is of a *Double Nature*: The *Operations* of the *Affections*, if they be *Vehement*; And the *Operation* of the *Imagination*, if it be *Strong*. But these two are so *Coupled*, as wee shall handle them together: For when an *Envious*, or *Amorous Aspect*, doth infect the *Spirits* of Another, there is Joyned both *Affection*, and *Imagination*.

The Sixth is, the *Influxes* of the *Heavenly Bodies*, besides those two Manifest Ones, of *Heat*, and *Light*. But these we will handle, where we handle the *Celestiall Bodies*, and *Motions*.

The Seventh is the *Operations* of *Sympathy*; Which the *Writers* of *Naturall Magicke* have brought into an *Art*, or *Precept*: And it is this; That if you desire to *Super-induce*, any *Vertue* or *Disposition*, upon a *Person*, you should take the *Living Creature*, in which that *Vertue* is most *Eminent*, and in *Perfection*: Of that *Creature* you must take the *Parts*, wherein that *Vertue* chiefly is *Collocate*: Again, you must take those *Parts*, in the *Time*, and *Age*, when that *Vertue* is most in *Exercise*; And then you must apply it to that *Part* of *Man*, wherein that *Vertue* chiefly *Consisteth*. As if you would *Super-induce* *Courage* and *Fortitude*, take a *Lion*, or a *Cock*; And take the *Heart*, *Tooth*, or *Paw* of the *Lion*; Or the *Heart*, or *Spurre* of the *Cock*: Take those *Parts* immediately after the *Lion*, or the *Cock* have beene in *Fight*; And let them be worne, upon a *Mans Heart*, or *Wrest*. Of these and such like *Sympathies*, we shall speake under this present *Title*.

The Eighth and last is, an *Emission* of *Immaterial Vertues*; Such as we are a little doubtfull to *Propound*; It is so prodigious; But that it is so constantly avouched by many: And wee have set it downe, as a *Law* to our Selves, to examine things to the *Bottom*; And not to receive upon *Credit*, or reject upon *Improbabilities*, untill there hath passed a due *Examination*. This is, the *Sympathy* of *Individuals*: For as there

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there is a *Sympathy of Species*; So, (it may be) there is a *Sympathy of Individuals*: That is, that in *Things*, or the *Parts of Things*, that have been once *Contiguous*, or *Entire*, there should remaine a *Transmission of Vertue*, from the One to the Other: As betweene the *Weapon*, and the *Wound*. Whereupon is blazed abroad the *Operation of Unguentum Teli*: And so of a *Peece of Lard*, or *Sticke of Elder*, &c. that if *Part* of it be Consumed or Putrified, it will worke upon the other *Part Severed*. Now wee will pursue the *Instances* themselves.

Experiments
in Confort
touching Emis-
sion of Spirits
in Vapour, or
Exhalation,
Odour-like.

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THe *Plague* is many timestaken without *Manifest Sense*, as hath been said. And they report, that where it is found, it hath a *Sent*, of the *Smell of a Mellow Apple*; And (as some say) of *May Flowers*: And it is also received, that *Smells of Flowers*, that are *Mellow and Lushious*, are ill for the *Plague*; As *White Lillies*, *Cowslips*, and *Hyacinths*.

The *Plague* is not easily received by such, as continually are about them, that have the *Plague*; As *Keepers of the Sioke*, and *Physicians*; Nor againe by such as take *Antidotes*, either *Inward*, (as *Mithridate*; *Iuniper-Berries*; *Rue*, *Leafe and Seed*; &c.) Or *Outward*, (as *Angelica*, *Zedoarie*, and the like, in the Mouth; *Terre*, *Galbanum*, and the like, in Perfume,) Nor againe by *Old People*, and such as are of a *Dry and Cold Complexion*. On the other side, the *Plague* taketh soonest hold of those, that come out of a *Fresh Aire*; And of those that are *Fasting*; And of *Children*; And it is likewise noted to goe in a *Bloud*, more than to a *Stranger*.

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The most *Pernicious Infection*, next the *Plague*, is the *Smell of the Tayle*; When *Prisoners* have beene Long, and Close, and Nastily kept; Whereof we have had, in our time, Experience, twice or thrice; when both the *Judges* that sat upon the *Tayle*, and *Numbers* of those that attended the *Businesse*, or were present, *sickned* upon it, and *Died*. Therefore it were good wisdom, that in such Cases, the *Tayle* were *Aired*, before they be brought forth.

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Out of question, if such *Foule Smells* be made by *Art*, and by the *Hand*, they consist chiefly of *Mans Flesh*, or *Sweat*, *Putrified*; For they are not those *Stinks*, which the *Nosthils* straight abhorre, and expell, that are most *Pernicious*; But such *Aires*, as have some Similitude with *Mans Body*; And so insinuate themselves, and betray the *Spirits*. There may be great danger, in using such Compositions, in great Meetings of People, within Houses; As in *Churches*; At *Arraignments*; At *Playes* and *Solemnities*; And the like; For *Poysoning of Aire* is no lesse dangerous than *Poysoning of Water*; Which hath beene used by the *Turks* in the *Warres*; And was used by *Emanuel Comnenus* towards the *Christians*, when they passed thorow his *Countrie* to the *Holy Land*. And these *Empoysonments of Aire*, are the more dangerous in Meetings of People; Because the much *Breath of People*, doth further the *Reception of the Infection*: And therefore, where any such Thing is feared, it were good, those *Publique Places* were perfumed, before the *Assemblies*.

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The *Empoysonment* of Particular Persons, by *Odours*, hath beene reported

ported to be in *Perfumed Gloves*, or the like: And it is like, they Mingle the *Poyson* that is deadly, with some *Smells* that are Sweet, which also maketh it the sooner received. *Plagues* also have been raised by *Annoyances* of the *Chincks* of *Doores*, and the like; Not so much by the Touch, as for that it is common for *Men*, when they finde anything Wet upon their *Fingers*, to put them to their *Nose*; Which *Men* therefore should take heed how they doe. The best is, that these *Compositions* of *Infectious Aires*, cannot be made without *Danger* of *Death*, to them that make them. But then againe, they may have some *Antidotes* to save themselves; So that *Men* ought not to be secure of it.

There have beene, in divers *Countries*, great *Plagues*, by the *Putrefaction*, of great *Swarmes* of *Grasse-Hoppers*, and *Locusts*, when they have beene dead, and cast upon *Heaps*.

It happeneth oft in *Mines*, that there are *Damps*, which kill, either by *Suffocation*, or by the *Poysonous Nature* of the *Minerall*: And those that deale much in *Refining*, or other *Works* about *Metals*, and *Minerals*, have their *Brains* Hurt & *Stupefied* by the *Metalline Vapours*. Amongst which, it is noted, that the *Spirits* of *Quick-Silver*, ever flie to the *Skull*, *Teeth*, or *Bones*; In so much as *Gilders* use to have a *Peece* of *Gold* in their *Mouth*, to draw the *Spirits* of the *Quick-Silver*; Which *Gold* afterwards they finde to be *Whitened*. There are also certaine *Lakes*, and *Pits*, such as that of *Avernus*, that *Poyson Birds*, (as is said,) which fly over them; Or *Men*, that stay too long about them.

The *Vapour* of *Char-Coale*, or *Sea-Coale*, in a *Close Room*, hath killed many: And it is the more dangerous, because it commeth without any *Ill Smell*; But stealeth on by little & little; Enducing only a *Faintnesse*, without any *Manifest Strangling*. When the *Dutch-Men* Wintred at *Nova Zembla*, and that they could gather no more *Sticks*, they fell to make *Fire* of some *Sea-Coale* they had, wherewith (at first) they were much refreshed; But a little after they had sit about the *Fire*, there grew a *Generall Silence*, and lothnesse to speake amongst them; And immediately after, One of the *Weakest* of the *Company*, fell downe in a *Swoune*; Whereupon they doubting what it was, opened their doore, to let in *Aire*, and so saved themselves. The *Effect* (no doubt) is wrought by the *Inspissation* of the *Aire*; And so of the *Breath*, and *Spirits*. The like ensueth in *Roomes* newly *Plastered*, if a *Fire* be made in them; Whereof no lesse *Man* than the *Emperour Iovinianus* Died.

Vide the *Experiment*, 803. touching the *Infectious Nature* of the *Aire*, upon the *First Showers*, after long *Drought*.

It hath come to passe, that some *Apothecaries*, upon *Stamping* of *Coloquintida*, have beene put into a great *Skouring*, by the *Vapour* onely.

It hath beene a *Practice*, to burne a *Pepper*, they call *Ginny-Pepper*; Which hath such a strong *Spirit*, that it provoketh a *Continuall Sneezing*, in those that are in the *Roome*.

It is an *Ancient Tradition*, that *Bleare-Eyes* infect *Sound-Eyes*; And that a *Menstruous Woman*, looking upon a *Glasse*, doth rust it. Nay they have

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have an Opinion, which seemeth *Fabulous*; That *Menstruous Women*, going over a *Field*, or *Garden*, doe *Corne* and *Herbs* good by *Killing* the *Wormes*.

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The *Tradition* is no lesse *Ancient*, that the *Basiliske* killeth by *Aspect*; And that the *Wolfe*, if hee see a *Man* first, by *Aspect* striketh a *Man* hoarse.

925

Perfumes Convenient doe drie and strengthen the *Braine*; And stay *Rheumes* and *Defluxions*; As we finde in *Fume* of *Rose-Marie* dried, and *Lignum-Aloës*, and *Calamus*, taken at the *Mouth*, and *Nostrils*; And no doubt there be other *Perfumes*, that doe moisten, and refresh; And are fit to be used in *Burning Agues*, *Consumptions*, and too much *Wakefulness*; Such as are, *Rose-Water*, *Vinegar*, *Limon-Pills*, *Violets*, the *Leaves* of *Vines* sprinkled with a little *Rose Water*; &c.

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They doe use in *Sudden Faintings*, and *Swounings*, to put a *Hindkerchiefe* with *Rose-Water*, or a little *Vinegar*, to the *Nose*; Which gathereth together againe the *Spirits*, which are upon point to resolve, and fall away.

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Tobacco comforteth the *Spirits*, and dischargeth *Wearienesse*; Which it worketh partly by *Opening*; But chiefly by the *Opiate Vertue*, which condenseth the *Spirits*. It were good therefore to trie the *Taking* of *Fumes* by *Pipes*, (as they doe in *Tobacco*;) of other *Things*; As well to drie, and comfort, as for other *Intentions*. I wish *Triall* be made of the *Drying Fume*, of *Rose-Marie*, and *Lignum Aloës*, before mentioned, in *Pipe*; And so of *Nutmeg*, and *Folium Indum*; &c.

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The *Following* of the *Plough*, hath beene approved, for *Refreshing* the *Spirits*, and *Procuring Appetite*: But to doe it in the *Ploughing* for *Wheat*, or *Rye*, is not so good; Because the *Earth* hath spent her *Sweet Breath*, in *Vegetables*, put forth in *Summer*. It is better therefore to doe it, when you sow *Barley*. But because *Ploughing* is tied to *Seasons*, it is best to take the *Aire* of the *Earth*, new turned up, by *Digging* with the *Spade*; Or *Standing* by him that *Diggeth*. *Gentlewomen* may doe themselves much good by kneeling upon a *Cushion*, and *Weeding*. And these *Things* you may practise in the best *Seasons*; Which is ever the *Early Spring*, before the *Earth* putteth forth the *Vegetables*; And in the *Sweetest Earth* you can chuse. It would be done also, when the *Dew* is a little off the *Ground*, lest the *Vapour* be too *Moist*. I knew a great *Man*, that lived Long, who had a *Cleane Clod* of *Earth*, brought to him everie *Morning*, as hee sat in his *Bed*; And hee would hold his *Head* over it, a good prettie while. I commend also, sometimes, in *Digging* of *New Earth*, to poure in some *Malmesey*, or *Greeke Wine*; That the *Vapour* of the *Earth*, and *Wine* together, may comfort the *Spirits*, the more; Provided alwayes, it be not taken, for a *Heathen Sacrifice*, or *Libation* to the *Earth*.

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They have, in *Physicke*, Use of *Pomanders*, and *Knots* of *Powders*, for *Drying* of *Rheumes*, *Comforting* of the *Heart*, *Provoking* of *Sleepe*, &c. For though those *Things* be not so Strong as *Perfumes*, yet you may have them continually in your *Hand*; whereas *Perfumes* you can take but at *Times*;

Times, And besides, there be divers Things, that breath better of themselves, than when they come to the Fire; As *Nigella Romana*, the Seed of *Melanthium*, *Anomum*, &c.

There be two Things, which (inwardly used) doe Coole and condense the Spirits; And I wish the same to be tried outwardly in Vapours. The One is *Nitre*, which I would have dissolved in *Malmesey*, or *Greeke-Wine*, and so the Smell of the Wine taken; Or if you would have it more forcible, poure of it upon a Fire-pan, well heated, as they doe *Rose-Water*, and *Vinegar*. The other is, the Distilled Water of *Wilde Poppy*, which I wish to be mingled, at halfe, with *Rose-Water*, and so taken with some Mixture of a few Cloves, in a Perfuming-Pan. The like would be done with the Distilled Water of *Saffron Flowers*.

Smells of Muske, and Amber, and Civit, are thought to further Venerous Appetite: Which they may doe by the Refreshing and Calling forth of the Spirits.

Incense, and Nidorous Smells, (such as were of Sacrifices,) were thought to Intoxicate the Braine, and to dispose Men to Devotion: Which they may doe, by a kinde of Sadnesse, and Constriction of the Spirits: And partly also by Heating, and Exalting them. Wee see, that amongst the Jewes, the Principall Perfume of the Sanctuarie, was forbidden all Common Uses.

There be some Perfumes, prescribed by the Writers of Naturall Magicke, which procure Pleasant Dreames; And some others, (as they say,) that procure Propheticall Dreames; As the Seeds of Flax, Fleawort, &c.

It is certaine, that Odours doe, in a small Degree, Nourish; Especially the Odour of Wine: And we see Men an hungred, doe love to smell Hot Bread. It is related, that *Democritus*, when he lay a dying, heard a Woman, in the House, complaine, that shee should be kept from being at a Feast, and Solemnitie, (which shee much desired to see,) because there would be a Corps in the House; Whereupon hee caused Loaves of New Bread to be sent for, and opened them; And powred a little Wine into them; And so kept himselfe alive with the Odour of them, till the Feast was past. I knew a Gentleman, that would fast (sometimes) three or foure, yea five dayes, without Meat, Bread, or Drinke; But the same Man used to have continually, a great Wisp of Herbs, that hee smelled on: And amongst those Herbs, some Esculent Herbs of strong Sent; As Onions, Garliske, Leekes, and the like.

They doe use, for the Accident of the Mother, to burne Feathers, and other Things of Ill Odour: And by those Ill Smells, the Rising of the Mother is put downe.

There be Aires, which the Physitians advise their Patients to remove unto, in Consumptions, or upon Recoverie of Long Sickneses: Which (commonly) are Plaine Champaignes, but Grasing, and not Over-growne with Heath, or the like: Or else Timber-Shades, as in Forrests, and the like. It is noted also, that Groves of Bayes doe forbid Pestilent Aires; Which was accounted

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accounted a great Cause of the Wholefome Aire of *Antiochia*. There be also some *Soyle* that put forth *Odorate Herbs* of themselves; As *Wilde Thyme*; *Wilde Marjoram*; *Penny-Royall*; *Camomill*; And in which the *Brier-Roses* smell almost like *Muske-Roses*; Which (no doubt) are *Signes* that doe discover an *Excellent Aire*.

It were good for *Men*, to thinke of having *Healthfull Aire*, in their *Houses*; Which will never be, if the *Roomes* be *Low-roofed*, or full of *Windows*, and *Doores*; For the one maketh the *Aire Close*, and not *Fresh*; And the other maketh it *Exceeding Vnequall*; Which is a great *Enemie* to *Health*. The *Windows* also should not be high up to the *Roofe*, (which is in use for *Beautie*, and *Magnificence*;) but *Low*. Also *Stone-Walls* are not wholefome; But *Timber* is more wholefome; And especially *Brick*. Nay it hath beene used by some, with great *Successe*, to make their *Walls* thicke; And to put a *Lay* of *Chalke* betweene the *Bricks*, to take away all *Dampishnesse*.

Experiment
Solitary, touch-
ing the
Emissions of
Spirituall Spe-
cies which Af-
fect the Senses.

These *Emissions*, (as wee said before,) are handled, and ought to be handled, by themselves, under their *Proper Titles*: That is, *Visibles*, and *Audibles*, each a-part: In this Place, it shall suffice to give some generall *Observations*, Common to both. First, they seeme to be *Incorporeall*. Secondly, they Worke *Swiftly*. Thirdly, they Worke at *Large Distances*. Fourthly, in *Curious Varieties*. Fifthly, they are not *Effective* of any *Thing*; Nor leave no *Work* behind them; But are *Energies* meere-ly; For their *Working* upon *Mirroures*, and *Places* of *Echo*, doth not alter any *Thing* in those *Bodies*; But it is the same *Action* with the *Originall*, onely *Repercussed*. And as for the *Shaking* of *Windows*, or *Rarefying* the *Aire* by *Great Noyses*; And the *Heat* caused by *Burning-Glasses*; They are rather *Concomitants* of the *Audible*, and *Visible Species*, than the *Effects* of them. Sixthly, they seeme to be of so *Tender*, and *Weake* a *Nature*, as they affect onely such a *Rare*, and *Attenuate Substance*, as is the *Spirit* of *Living Creatures*.

Experiments
in Consort,
touching the
Emission of Im-
materiate Ver-
ties from the
Minds, and
Spirits of Men,
either by Affe-
ctions, or by
Imaginations,
or by other
Impressions.

It is mentioned in some *Stories*, that where *Children* have beene *Exposed*, or taken away young from their *Parents*; And that afterwards they have approached to their *Parents* presence, the *Parents*, (though they have not knowne them,) have had a *Secret Joy*, or Other *Alteration* thereupon.

There was an *Egyptian South-Sayer*, that made *Antoninus* beleieve, that his *Genius*, (which otherwise was *Brave*, and *Confident*;) was, in the Presence of *Octavianus Caesar*, *Poore*, and *Cowardly*: And therefore, he advised him, to absent himselfe, (as much as he could,) and remove far from him. This *South-Sayer* was thought to be suborned by *Cleopatra*, to make him live in *Egypt*, and other *Remote Places* from *Rome*. Howsoever the *Conceit* of a *Predominant* or *Mastering Spirit*, of one *Man* over *Another*, is *Ancient*, and *Received* still, even in *Vulgar Opinion*.

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There are Conceits, that some Men, that are of an *ill*, and *Melancholy* Nature, doe incline the Company, into which they come, to be *Sad*, and *ill disposed*; And contrariwise, that Others, that are of a *Ioyfull* Nature, doe dispose the Company to be *Merrie* and *Cheerefull*. And againe, that some Men are *Luckie* to be kept Company with, and *Employed*; And Others *Unluckie*. Certainly, it is agreeable to Reason, that there are, at the least, some *Light Effluxions* from Spirit to Spirit, when Men are in Presence one with another, as well as from Body to Body.

It hath been observed, that Old Men, who have loved Young Company, and beene Constant continually with them, have beene of Long Life; Their Spirits, (as it seemeth,) being Recreated by such Company. Such were the Ancient Sophists, and Rhetoricians; Which ever had Young Auditors, and Disciples; As Gorgias, Protagoras, Isocrates, &c. Who lived till they were an Hundred yeares Old. And so likewise did many of the Grammarians, and School-Masters; such a was Ortilius, &c.

Audacitie and Confidence doth, in Civill Businesse, so great Effects, as a Man may (reasonably) doubt, that besides the verie Daring, and Earnestnesse, and Persisting, and Importunitie, there should be some Secret Binding, and Stopping of other Mens Spirits, to such Persons.

The Affections (no doubt) doe make the Spirits more Powerfull, and Active; And especially those Affections, which draw the Spirits into the Eyes: Which are two: Love, and Envie, which is called *Oculus Malus*. As for Love, the Platonists, (some of them,) goe so farre, as to hold that the Spirit of the Lover, doth passe into the Spirits, of the Person Loved; Which causeth the desire of Returne into the Body, whence it was Emitted: Whereupon followeth that Appetite of Contract, and Conjunction, which is in Lovers. And this is observed likewise, that the Aspects that procure Love, are not Gazings, but Sudden Glances, and Dartings of the Eye. As for Envie, that emitteth some Maligne and Poysonous Spirits, which taketh hold of the Spirit of Another; And is likewise of greatest Force, when the Cast of the Eye is Oblique. It hath beene noted also, that it is most Dangerous, when an Envious Eye is cast upon Persons in Glory, and Triumph, and Joy. The Reason whereof is, for that, at such times, the Spirits come forth most, into the Outward Parts, and so meet the Percussion of the Envious Eye, more at Hand: And therefore it hath beene noted, that after great Triumphs, Men have beene ill disposed, for some Dayes following. Wee see the Opinion of Fascination is Ancient, for both Effects, Of Procuring Love; And Sicknesse caused by Envie: And Fascination is ever by the Eye. But yet if there be any such Infection from Spirit to Spirit, there is no doubt, but that it worketh by Presence, and not by the Eye alone; Yet most Forcibly by the Eye.

Feare, and Shame, are likewise Infective; For wee see that the Starting of one will make another ready to Start: And when one Man is out of Countenance in a Company, others doe likewise Blush in his behalfe.

Now wee will speake of the *Force of Imagination* upon other Bodies; And of the *Meanes to Exalt and Strengthen it*. *Imagination*, in this Place, I understand to be, the *Representation of an Individuall Thought*. *Imagination* is of three Kinds: The First *Joyned with Beleeve* of that which is to *Come*: The Second *Joyned with Memorie* of that which is *Past*; And the Third is of *Things Present*, or as if they were *Present*; For I comprehend in this, *Imaginations Faigned*, and at *Pleasure*; As if one should *Imagine* such a *Man* to be in the *Vestments of a Pope*; Or to have *Wings*. I single out, for this time, that which is with *Faith*, or *Beleeve* of that which is to *Come*. The *Inquisition* of this *Subject*, in our way, (which is by *Induction*;) is wonderfull hard; for the *Things* that are reported, are full of *Fables*; And *New Experiments* can hardly be made, but with *Extreme Caution*, for the *Reason* which we will hereafter declare.

The *Power of Imagination* is in three Kindes; The First, upon the *Body of the Imaginant*; Including likewise the *Child in the Mothers Womb*; The Second is, the *Power of it upon Dead Bodies*, as *Plants, Wood, Stone, Metall, &c.* The Third is, the *Power of it, upon the Spirits of Men, and Living Creatures*; And with this last we will onely meddle.

The *Probleme* therefore is, whether a *Man Constantly and Strongly Beleeving*, that such a *Thing* shal be; (As that such an *One will Love Him*; Or that such an *One will Grant Him his Request*; Or that such an *One shall Recover a Sicknesse*; Or the like;) It doth help any thing to the *Effecting* of the *Thing* it selfe. And here againe we must warily distinguish; For it is not meant, (as hath beene partly said before,) that it should help by *Making a Man more Stout, or more Industrious*; (In which kinde a *Constant Beleeve* doth much;) But meerely by a *Secret Operation, or Binding, or Changing the Spirit of Another*: And in this it is hard (as we began to say,) to make any *New Experiment*; For I cannot command my Selfe to *Beleeve what I will*, and so no *Triall* can be made. Nay it is worse; For whatsoever a *Man Imagineth doubtingly*, or with *Feare*, must needs doe hurt, if *Imagination* have any *Power* at all;

For

For a *Man* representeth that officer, that hee feareth, than the contrarie.

The Help therefore is, for a *Man* to worke by *Another*, in whom he may Create *Beleeve*, and not by *Himselfe*; *Unle*ss *Himselfe* have found by *Experience*, that *Imagination* doth prevaile; For then *Experience* worketh in *Himselfe* *Beleeve*; If the *Beleeve*, that such a *Thing* shall be, be joynd with a *Beleeve*, that his *Imagination* may procure it.

For Example, I related one time to a *Man*, that was Curious, and Vaine enough in these Things; That I saw a Kinde of Juggler, that had a Paire of Cards, and would tell a *Man* what Card he thought. This Pretended Learned *Man* told mee; It was a Mistaking in Mee; For (said hee) it was not the Knowledge of the Mans Thought, (for that is Proper to God,) but it was the Inforcing of a Thought upon him, and Binding his *Imagination* by a Stronger, that hee could Thinke no other Card. And thereupon he asked me a Question, or two, which I thought he did but cunningly, knowing before what used to be the Feats of the Juggler. Sir, (said hee,) doe you remember whether hee told the Card, the *Man* thought, *Himselfe*, or bade *Another* to tell it. I answered (as was true;) That he had *Another* tell it. Whereunto he said; So I thought: For (said he) *Himselfe* could not have put on so strong an *Imagination*; But by telling the other the Card, (who beleeved that the Juggler was some Strange *Man*, and could doe Strange Things,) that other *Man* taught a strong *Imagination*. I harkened unto him, thinking for a Vanitie he spoke prettily. Then he asked me another Question: Saith he; Doe you remember, whether he bade the *Man* thinke the Card first, and afterwards told the other *Man* in his Eares, what he should thinke, Or else that he did whisper first in the Mans Eare, that should tell the Card, telling that such a *Man* should thinke such a Card, and after bade the *Man* thinke a Card? I told him, as was true; That he did first whisper the *Man* in the Eare, that such a *Man* should thinke such a Card: Upon this the Learned *Man* did much Exult, and Please himselfe, saying; Loe, you may see that my Opinion is right: For if the *Man* had thought first, his Thought had beene Fixed; But the other Imagining first, bound his Thought. Which though it did somewhat sinke with me, yet I made it Lighter than I thought, and said; I thought it was Confederacie, betwene the Juggler, and the two Servants: Though (indeed) I had no Reason so to thinke: For they were both my Fathers Servants; And hee had never plaid in the House before. The Juggler also did cause a Garter to be held up; And tooke upon him, to know, that such an One, should point in such a Place, of the Garter; As it should be neare so many Inches to the Longer End, and so many to the shorter; And still he did it, by First Telling the Imaginer, and after Bidding the *Other* Thinke.

Having told this Relation, not for the Weight thereof, but

because it doth handsomely open the Nature of the Question; I returne to that I said; That Experiments of Imagination, must be practised by Others, and not by a Mans Selfe. For there be Three Meanes to fortifie Beleeve: The First is Experience: The Second is Reason: And the Third is Authoritie: And that of these, which is farre the most Potent, is Authoritie: For Beleeve upon Reason, or Experience, will Stagger.

947

For Authoritie, it is of two Kindes; Beleeve in an Art; And Beleeve in a Man. And for Things of Beleeve in an Art; A Man may exercise them by Himselfe; But for Beleeve in a Man, it must be by Another. Therefore, if a Man beleeve in Astrologie, and finde a Figure Prosperous; Or beleeve in Naturall Magicke, and that a Ring with such a Stone, or such a Peece of a Living Creature, Carried, will doe good; It may help his Imagination: But the Beleeve in a Man is farre the more Active. But howsoever, all Authoritie must be out of a Mans Selfe, turned (as was said,) either upon an Art, or upon a Man: And where Authoritie is from one Man to another, there the Second must be Ignorant, and not Learned, or Full of Thoughts; And such are (for the most part) all Witches, and Superstitious Persons; Whose Beleeves, tied to their Teachers, and Traditions, are no whit controlled, either by Reason, or Experience: And upon the same Reason, in Magicke, they use (for the most part,) Boyes, and Young People; whose Spirits easiliest take Beleeve, and Imagination.

Now to fortifie Imagination, there be three wayes: The Authoritie whence the Beleeve is derived; Meanes to Quicken and Corroborate the Imagination; And Meanes to Repeat it, and Refresh it.

948

For the Authoritie, wee have already spoken: As for the Second; Namely the Meanes to Quicken, and Corroborate the Imagination; We see what hath been used in Magick; (If there be in those Practises any thing that is purely Naturall;) As Vestments; Characters; Words; Seales; Some Parts of Plants, or Living Creatures; Stones; Choice of the Houre; Gestures and Motions; Also Incenses, and Odours; Choice of Societie, which increaseth Imagination; Diets and Preparations for some time before. And for Words, there have beene ever used, either Barbarous words, of no Sense, lest they should disturb the Imagination; Or Words of Similitude, that may second and feed the Imagination: And this was ever as well in Heathen Charmes, as in Charmes of latter Times. There are used also Scripture-Words; For that the Beleeve, that Religious Texts, and Words, have Power, may strengthen the Imagination. And for the same Reason, Hebrew Words, (which amongst us is counted the Holy Tongue, and the Words more Mysticall,) are often used.

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For the Refreshing of the Imagination, (which was the Third Meanes of Exalting it;) We see the Practices of Magicke, as in Images of Wax, and

and the like, that should Melt by little, and little; Or some other Things Buried in Mucke, that should Putrifie by little and little; Or the like; For so oft as the *Imaginant* doth thinke of those Things, so oft doth he represent to his *Imagination*, the *Effect* of that he desireth.

If there be any *Power* in *Imagination*, it is lesse credible, that it should be so *Incorporeall* and *Immateriate* a *Vertue*, as to worke at great *Distances*; Or through all *Mediums*; Or upon all *Bodies*: But that the *Distance* must be *Competent*; The *Medium* not *Adverse*; And the *Body* Apt and *Proportionate*. Therefore if there be any *Operation* upon *Bodies*, in *Absence*, by *Nature*; it is like to be conveyed from *Man* to *Man*, as *Fame* is; As if a *Witch*, by *Imagination*, should hurt any afaire off, it cannot be naturally, but by *Working* upon the *Spirit* of some, that commeth to the *Witch*; And from that *Partie* upon the *Imagination* of *Another*; And so upon *Another*; till it come to one that hath resort to the *Partie Intended*; And so by *Him* to the *Partie intended* himselfe. And although they speake, that it sufficeth, to take a *Point*, or a *Peece* of the *Garment*, or the *Name* of the *Partie*, or the like; yet there is lesse *Credit* to be given to those Things, except it be by *Working* of evill *Spirits*.

The *Experiments*, which may certainly demonstrate the *Power* of *Imagination*, upon other *Bodies*, are few, or none: For the *Experiments* of *Witchcraft*, are no cleare *Proofes*; For that they may be, by a *Tacite Operation* of *Maligne Spirits*: We shall therefore be forced, in this *Enquirie*, to resort to *New Experiments*: Wherein we can give only *Directions* of *Trialls*, and not any *Positive Experiments*. And if any *Man* thinke, that we ought to have stayed, till wee had made *Experiment*, of some of them, our selves, (as wee doe commonly in other *Titles*;) the *Truth* is, that these *Effects* of *Imagination* upon other *Bodies*, have so little *Credit* with us, as we shall trie them at leisure: But in the meane *Time*, we will lead others the way.

When you worke by the *Imagination* of *Another*, it is necessarie, that He, by whom you worke, have a *Precedent Opinion* of you, that you can doe *Strange Things*; Or that you are a *Man of Art*, as they call it; For else the *Simple Affirmation* to *Another*, that this or that shall be, can worke but a weake *Impression*, in his *Imagination*.

It were good, because you cannot discern fully of the *Strength* of *Imagination*, in one *Man* more than another, that you did use the *Imagination* of more than *One*; That so you may light upon a *Strong One*. As if a *Physitian* should tell *Three*, or *Foure*, of his *Patients Servants*, that their *Master* shall surely recover.

The *Imagination* of *One*, that you shall use, (such is the *Variety* of *Mens Mindes*;) cannot be alwayes alike *Constant*, and *Strong*; And if the

Successes follow not speedily, it will faint and leese strength. To remedy this, you must pretend to Him, whose *Imagination* you use, severall Degrees of *Meanes*, by which to *Operate*; As to prescribe him, that everie three Dayes, if he finde not the Successes Apparent, he doe use another Root, or Part of a Beast, or Ring, &c. As being of more Force; And if that faile, Another; And if that, Another; till Seven Times. Also you must prescribe a good Large Time for the Effect you promise; As if you should tell a *Servant* of a Sick-Man, that his Master shall recover, but it will be Fourteene dayes, ere hee findeth it apparently, &c. All this to entertaine the *Imagination*, that it waver lesse.

954

It is certaine, that *Potions*, or *Things* taken into the Body: *Incenses* and *Perfumes* taken at the *Nostrills*; And *Ointments* of some *Parts*; doe (naturally) worke upon the *Imagination* of Him that taketh them. And therefore it must needs greatly *Cooperate* with the *Imagination* of him, whom you use, if you prescribe him, before he doe use the *Receit*, for the Worke which he desireth, that hee doe take such a *Pill*, or a *Spoonfull* of *Liquour*; Or burne such an *Incense*; Or *Annoint* his *Temples*, or the *Soles* of his *Feet*, with such an *Ointment*, or *Oyle*: And you must chuse, for the Composition of such *Pill*, *Perfume*, or *Ointment*, such *Ingredients*, as doe make the *Spirits*, a little more *Grosse*, or *Muddie*: Whereby the *Imagination* will fix the better.

955

The Body *Passive*, and to be *Wrought Upon*, (I meane not of the *Imaginant*;) is better wrought upon, (as hath beene partly touched,) at some Times, than at others: As if you should prescribe a *Servant*, about a *Sicke Person*, (whom you have possessed, that his Master shall recover,) when his Master is fast asleepe, to use such a *Root*, or such a *Root*. For *Imagination* is like to worke better upon *Sleeping Men*, than *Men Awake*, As we shall shew when we handle *Dreames*.

956

Wee finde in the *Art of Memorie*, that *Images Visible*, worke better than other *Conceits*: As if you would remember the Word *Philosophy*, you shall more surely doe it, by *Imagining* that such a *Man*, (For *Men* are best *Places*;) is reading upon *Aristotles Physicks*; Than if you should *Imagine* him to say; I'll goe studie *Philosophy*. And therefore, this *Observation* would be translated to the Subject wee now speake of: For the more *Lustrous* the *Imagination* is, it filleth and fixeth the better. And therefore I conceive, that you shall, in that *Experiment*, (whereof wee spake before,) of *Binding of Thoughts*, lesse faile, if you tell One, that such an One shall name one of *Twentie Men*, than if it were One of *Twentie Cards*. The *Experiment of Binding of Thoughts*, would be *Diversified*, and tried to the Full: And you are to note, whether it hit for the most part, though not alwayes.

957

It is good to consider, upon what *Things*, *Imagination* hath most Force: And the *Rule*, (as I conceive,) is, that it hath most Force upon *Things*, that have the *Lightest*, and *Easiest Motions*. And therefore above all, upon the *Spirits* of *Men*: And in them, upon such *Affections*, as move *Lightest*; As upon *Procuring of Love*; *Binding of Lust*, which is

ever

ever with *Imagination*, upon *Men in Feare*; Or *Men in Irresolution*; And the like. Whatsoever is of this kinde would be thorowly enquired. *Trialls* likewise would be made upon *Plants*, and that diligently: As if you should tell a *Man*, that such a *Tree* would *Dye* this yeare, And will him, at these and these times, to goe unto it, to see how it thriveth. As for *Inanimate Things*, it is true, that the *Motions* of *Shuffling* of *Cards*, or *Casting* of *Dice*, are verie *Light Motions*: And there is a *Folly* verie usuall, that *Gamesters* imagine, that some that stand by them, bring them ill Luck. There would be *Triall* also made, of holding a *Ring* by a *Threed* in a *Glasse*, and telling him that holdeth it, before, that it shall strike so many times against the *Side* of the *Glasse*, and no more; Or of Holding a *Key* betweene two *Mens Fingers*, without a *Charme*; And to tell those that hold it, that at such Name, it shall goe off their *Fingers*: For these two are *Extreme Light Motions*. And howsoever I have no *Opinion* of these things, yet so much I conceive to be true; That *Strong Imagination* hath more Force upon *Things Living*; Or that have beene *Living*, than *Things* meerely *Inanimate*: And more Force likewise upon *Light*, and *Subtill Motions*, than upon *Motions* *Veherent*, or *Ponderous*.

It is an usuall *Observation*, that if the *Body* of One *Murdered*, be brought before the *Murderer*, the *Wounds* will bleed a-fresh. Some doe affirme, that the *Dead Body*, upon the *Presence* of the *Murderer*, hath opened the *Eyes*; And that there have beene such like *Motions*, as well where the *Partie Murdered* hath beene *Strangled*, or *Drowned*, as where they have beene *Killed* by *Wounds*. It may be, that this participateth of a *Miracle*, by *Gods* Iust Iudgement, who usuallly bringeth *Murders* to *Light*: But if it be *Naturall*, it must be referred to *Imagination*.

The *Tying* of the *Point* upon the day of *Marriage*, to make *Men* Impotent towards their *Wives*, which (as wee have formerly touched,) is so frequent in *Zant*, and *Gascony*, if it be *Naturall*, must be referred to the *Imagination* of *Him* that *Tie*th the *Point*. I conceive it to have the lesse *Affinitie* with *Witchcraft*, because not *Peculiar Persons* onely, (such as *Witches* are,) but any *Body* may doe it.

There be many *Things*, that worke upon the *Spirits* of *Man*, by *Secret Sympathy*, and *Antipathy*: The *Vertues* of *Pretious Stones*, worne, have beene anciently and generally Received; And curiously assigned to worke severall *Effects*. So much is true; That *Stones* have in them fine *Spirits*; As appeareth by their *Splendour*: And therefore they may work by *Consent* upon the *Spirits* of *Men*, to *Comfort*, and *Exhilarate* them. Those that are the best, for that *Effect*, are the *Diamond*, the *Emerald*, the *Iacinth* Or *entall*, and the *Gold-Stone*, which is the *Yellow Topaze*. As for their particu'ar *Proprieties*, there is no *Credit* to be given to them. But it is manifest, that *Light*, above all things, excelleth in *Comforting* the *Spirits* of *Men*: And it is verie probable, that *Light Varied* doth the same *Effect*, with more *Noveltie*. And this is one of the *Causes*, why *Pretious Stones* comfort. And therefore it were good to haue *Tinted Lanthornes*, or

Experiments
in Consort
touching the
Secret Vertue
of Sympathy,
and Antipathy.

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or Tinted Skreenes, of Glasse Coloured into Greene, Blew, Carnation, Crimson, Purple, &c. And to use them with Candles in the Night. So likewise to have Round Glasses, not onely of Glasse Coloured thorow, but with Colours laid betweene Crystals, with Handles to hold in ones Hand. Prismes are also Comfortable Things. They have of Paris-Workes, Looking-Glasses, bordered with broad Borders of small Crystall, and great Counterfeit Pretious Stones, of all Colours, that are most Glorious and Pleasant to behold; Especially in the Night. The Pictures of Indian Feathers, are likewise Comfortable, and Pleasant to behold. So also Faire and Cleare Pooles doe greatly comfort the Eyes, and Spirits; Especially when the Sunne is not Glaring, but Overcast; Or when the Moone shineth.

961

There be divers Sorts of Bracelets fit to Comfort the Spirits; And they be of Three Intentions: Refrigerant; Corroborant; and Aperient. For Refrigerant, I wish them to be of Pearle, or of Corall, as is used: And it hath beene noted that Corall, if the Partie that weareth it be ill disposed, will wax Pale: Which I beleieve to be true, because otherwise Distemper of Heat will make Corall lose Colour. I Commend also Beads, or little Plates of Lapis Lazuli; And Beads of Nitre, either alone, or with some Cordiall Mixture.

962

For Corroboration and Confortation, take such Bodies as are of Astringent Qualitie, without Manifest Cold. I commend Bead-Amber, which is full of Astringion, but yet is *viscosum*, and not Cold; And is conceived to Impinguate those that weare such Beads: I commend also Beads of Harts-Horne, and Ivoire, which are of the like Nature; Also Orange-Beads; Also Beads of *Lignum Aloës*, Macerated first in Rose-Water, and Dried.

963

For Opening, I Commend Beads, or Peeces of the Roots of *Carduus Benedictus*: Also of the Roots of Piony the Male; And of Orris; And of *Calamus Aromaticus*; And of Rew.

964

The Cramp, (no doubt) commeth of Contraction of Sinnewes; Which is Manifest, in that it commeth either by Cold, or Drinesse; As after Consumptions, and Long Agues; For Cold and Drinesse doe (both of them) Contract, and Corrugate. Wee see also, that Chafing a little above the Place in paine, easeth the Cramp; Which is wrought by the Dilatation, of the Contracted Sinnewes, by Heat. There are in use, for the Prevention of the Cramp, two Things; The one Rings of Sea-Horse Teeth, worne upon the Fingers; The other Bands of Greene Periwinkle, (the Herb,) tied about the Calf of the Leg, or the Thigh, &c. where the Cramp useth to come. I doe finde this the more strange, because Neither of these have any Relaxing Vertue, but rather the Contrarie. I judge therefore, that their Working, is rather upon the Spirits, within the Nerves, to make them strive lesse; Than upon the Bodily Substance of the Nerves.

965

I would have Triall made of two other Kindes of Bracelets, for Comforting the Heart, and Spirits; The one of the Trochisch of Vipers, made into little Peeces of Beads; For since they do great Good Inwards, (especially for Pestilent Agues,) it is like they will be Effectuall Outwards; Where they may be applied in greater Quantitie. There would be Trochisch likewise

wise made of Snakes; Whole Flesh dried, is thought to have a *verie* Opening, and Cordiall Vertue. The other is, of Beads made of the *Suoder* Powder, which they call *Kermes*; Which is the Principall Ingredient in their Cordiall Confection *Alkermes*: The Beads would be made up with *Amber-Grice*, and some *Pamander*.

It hath beene long received, and confirmed by divers *Trincks*; That the Root of the *Male-Piony*, dried, tied to the Necke, doth helpe the *Colic* Sicknesse; And likewise the *Incubus*, which wee call the *Mare*. The Cause of both these Diseases, and especially of the *Epilepsia* from the *Stomach*, is the Grossnesse of the Vapours, which rise and enter into the Cells of the Braine: And therefore the Working is, by Extreme, and Subtile Attenuation; Which that Simple hath. I judge the like to be in *Castoreum*, *Muske*, *Rew-Seed*, *Agnus Castus Seed*, &c.

There is a Stone, which they call the *Bloud-Stone*, which worne is thought to be good for them that Bleed at the Nose: Which (no doubt) is by *Astriction*, and *Cooling* of the Spirits. Quere, if the Stone taken out of the *Toads Head*, be not of the like Vertue; For the *Toad* loveth Shade, and Coolenesse.

Light may be taken from the Experiment of the *Horse-Tooth-Ring*, and the Garland of *Periwinkle*, how that those things, which assuage the Strife of the Spirits, doe help diseases, contrarie to the Intention desired: For in the Curing of the *Cramp*, the Intention is to relax the sinewes; But the Contraction of the Spirits, that they strive lesse, is the best Help: So to procure easie *Travailes* of Women, the Intention is to bring downe the *Childe*; But the best Help is, to stay the *Comming* downe too Fast: Wherunto they say, the *Toad-Skin* likewise helpeth. So in *Pestilent Feavers*, the Intention is to expell the Infection by *Sweat*, and *Evaporation*; But the best Meanes to doe it, is by *Nitre*, *Diaferdium*, and other Coole Things, which doe for a time arrest the Expulsion; till Nature can doe it more quietly. For as one saith prettily; In the Quenching of the Flame of a *Pestilent Ague*, Nature is like People, that come to quench the Fire of a House; which are so busie, as one of them letteth another. Surely, it is an Excellent Axiome, and of Manifold Use, that whatsoever appeaseth the Contention of the Spirits, furthereth their Action.

The Writers of *Naturall Magick*, commend the Wearing of the Spoile of a Snake, for Preserving of Health. I doubt it is but a Conceit; For that the Snake is thought to renew her Youth, by Casting her Spoile. They might as well take the Beake of an Eagle, or a Peece of a Harts-Horne, because those Renew.

It hath beene Anciently Received, (For *Pericles* the Athenian used it,) and it is yet in use, to weare little Bladders of *Quick-Silver*, or Tablets of *Arsenicke*, as Preservatives against the Plague: Not as they conceive, for any Comfort they yeeld to the Spirits, but for that being Poysons themselves, they draw the Venome to them, from the Spirits.

Vide the Experiments 95. 96. and 97. touching the severall Sympthies, and Antipathies, for Medicinall Use.

It

972

It is said, that the *Guts* or *Skin* of a *Wolfe* being applyed to the *Belly*, doe cure the *Cholicke*. It is true, that the *Wolfe* is a *Beast* of great *Education* and *Digestion*; And so, it may be, the *Parts* of him comfort the *Stomach*.

973
880

We see *Scare-Crowes*, are set up to keep *Birds* from *Corn*, and *Fruit*; It is reported by some, that the *Head* of a *Wolfe*, whole, dried, and hanged up in a *Dove-House*, will scare away *Vermine*; Such as are *Weasls*, *Balkats*, and the like. It may be, the *Head* of a *Dog* will doe as much; For those *Vermine* with us, know *Dogs* better than *Wolves*.

974

The *Brains* of some *Creatures*, (when their *Heads* are roasted) taken in *Wine*, are said to strengthen the *Memorie*: As the *Brains* of *Hares*; *Brains* of *Hens*; *Brains* of *Deeres*, &c. And it seemeth, to be incident to the *Brains* of those *Creatures*, that are *Fearfull*.

975

The *Ointment*, that *Witches* use, is reported to be made, of the *Fat* of *Children*, digged out of their *Graves*; Of the *Juyces* of *Smallage*, *Wolfebane*, and *Cinquefoile*; Mingled with the *Meale* of fine *wheat*. But I suppose that the *Soporiferous Medicines* are likeliest to doe it; Which are *Henbane*, *Hemlocke*, *Mandrake*, *Moone-Shade*, *Tobacco*, *Opium*, *Saffron*, *Poplar-Leaves*, &c.

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976

It is reported by some, that the *Affections* of *Beasts*, when they are in *Strength*, doe adde some *Virtue*, unto *Inanimate Things*; As that the *Skin* of a *sheepe*, devoured by a *Wolfe*, moveth *itching*; That a *Stone*, bitten by a *Dog* in *Anger*, being throwne at him, drunke in *Powder*, provoketh *Choler*.

977

It hath beene observed, that the *Diet* of *Women* with *Childe*, doth worke much upon the *Infant*; As if the *Mother* eat *Quinces* much, and *Coriander-Seed*, (the *Nature* of both which is to repress and stay *Vapours*, that ascend to the *Braine*,) it will make the *Childe* *Ingenious*: And on the contrarie side, if the *Mother* eat (much) *Onions*, or *Beanes*, or such *Vaporous Food*; Or drinke *Wine*, or *Strong Drinke*, immoderately; Or *Fast* much; Or be given to much *Musing*; (All which send, or draw *Vapours* to the *Head*,) It endangereth the *Childe* to become *Lunaticke*, or of *Imperfect Memorie*: And I make the same *Iudgement* of *Tobacco*, often taken by the *Mother*.

978

The *Writers* of *Naturall Magick* report, that the *Heart* of an *Ape*, worne neare the *Heart*, comforteth the *Heart*, and increaseth *Audacitie*. It is true, that the *Ape* is a *Merrie* and *Bold Beast*. And that the same *Heart* likewise of an *Ape*, applyed to the *Necke*, or *Head*, helpeth the *wit*; And is good for the *Falling-Sicknesse*: The *Ape* also is a *Wittie Beast*, and hath a *Dry Braine*; Which may be some *Cause* of *Attenuation* of *Vapours* in the *Head*. Yet it is said to move *Dreames* also. It may be, the *Heart* of a *Man* would doe more, but that it is more against *Mens Mindes* to use it; Except it be in such as weare the *Reliques* of *Saints*.

979

The *Flesh* of a *Hedge-Hog*, Dressed, & Eaten, is said to be a great *Drier*: It is true, that the *Juyce* of a *Hedge-Hog*, must needs be *Harsh*, & *Dry*, because it putteth forth so many *Prickles*: For *Plants* also, that are full of *Prickles*.

Prickles, are generally Dry: As *Briars*, *Thornes*, *Berberries*: And therefore the *Abs* of an *Hedge-Hog* are said to be a great *Desiccative* of *Fistula's*.

Mummy hath great force in *Stanching* of *Bloud*; which, as it may be ascribed to the *Mixture* of *Balmes*, that are *Glutinous*; So it may also partake of a *Secret Proprietic*; In that the *Bloud* draweth *Mans Flesh*. And it is approved, that the *Mosse*, which groweth upon the *Skull* of a *Dead Man*, unburied, will stanch *Bloud* potently. And so doe the *Dregs*, or *Powder* of *Bloud*, severed from the *Water*, and *Dried*.

It hath beene practised, to make *White Swallowes*, by *Annointing* of the *Egs* with *Oyle*. Which *Effect* may be produced, by the *Stopping* of the *Pores* of the *Shell*, and making the *Juice*, that putteth forth the *Feathers* afterwards, more *Penurious*. And it may be, the *Annointing* of the *Egs*, will be as *Effectuall*, as the *Annointing* of the *Body*; Of which *Vide* the *Experiment* 93.

It is reported, that the *White* of an *EGge*, or *Bloud*, mingled with *Salt-Water*, doth gather the *Saltneffe*, and maketh the *Water* sweeter. This may be by *Adhesion*; As in the 6. *Experiment* of *Clarification*: It may be also, that *Bloud*, and the *White* of an *EGge*, (which is the *Matter* of a *Living Creature*,) have some *Sympathy* with *Salt*: For all *Life* hath a *Sympathy* with *Salt*. We see that *Salt*, laid to a *Cut Finger*, healeth it; So as it seemeth *Salt* draweth *Bloud*, as well as *Bloud* draweth *Salt*.

It hath beene anciently received, that the *Sea-Hare*, hath an *Antipathy* with the *Lungs*, (if it commeth neare the *Body*,) and erodeth them. Wher of the *Cause* is conceived to be, a *Qualitie* it hath of *Heating* the *Breath*, and *Spirits*; As *Cantharides* have upon the *Watry Parts* of the *Bodie*; As *Vrine* and *Hydropicall Water*. And it is a good *Rule*, that whatsoever hath an *Operation* upon certaine *Kindes* of *Matters*, that, in *Mans Body*, worketh most upon those *Parts*, wherein that kinde of *Matter* aboundeth.

Generally, that which is *Dead*, or *Corrupted*, or *Excerned*, hath *Antipathy* with the same *Thing*, when it is *Alive*, and when it is *Sound*; And with those *Parts* which doe *Excerne*: As a *Carkasse* of *Man* is most *Infectious*, and *Odious* to *Man*; A *Carrion* of an *Horse* to an *Horse*, &c. *Purulent Matter* of *Wounds*, and *Ulcers*, *Carbuncles*, *Pocks*, *Scabs*, *Leprousie*, to *Sound Flesh*; And the *Excrement* of everie *Species* to that *Creature* that *Excerneth* them. But the *Excrements* are lesse *Pernicious* than the *Corruptions*.

It is a *Common Experience*, that *Dogs* know the *Dog-Killer*; When as in times of *Infection*, some *Pettie Fellow* is sent out to kill the *Dogs*; And that, though they have never seene him before, yet they will all come forth, and barked, and flie at him.

The *Relations* touching the *Force* of *Imagination*, and the *Secret Instincts* of *Nature*, are so uncertaine, as they require a great deale of *Examination*, ere wee conclude upon them. I would have it first thorowly inquired, whether there be any *Secret Passages* of *Sympathy*, betweene
Persons

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Persons of neare Bloud; As Parents, Children, Brothers, Sisters, Nurse-Children, Husbands, Wives, &c. There be many Reports in *Historie*, that upon the Death of Persons of such Nearenesse, Men have had an inward Feeling of it. I my Selfe remember, that being in *Paris*, and my Father dying in *London*, two or three dayes before my Fathers death, I had a Dreame, which I told to divers English Gentlemen; That my Fathers House, in the Countrey, was Plastered all over with Blacke Mortar. There is an Opinion abroad, (whether Idle or no I cannot say,) That loving and kinde Husbands, have a Sense of their Wives Breeding Childe, by some Accident in their owne Bodie.

987

Next to those that are Neare in Bloud, there may be the like Passage, and Instincts of Nature, betweene great Friends, and Enemies: And sometimes the Revealing is unto Another Person, and not to the Partie Himselfe. I remember *Philippus Comminus*, (a grave Writer,) reporteth; That the Arch-Bishop of *Vienna*, (a Reverend Prelate,) said (one day) after Masse, to King *Lewis* the eleventh of France; Sir, your Mortall Enemy is dead; What time Duke Charles of Burgundie was Slaine, at the Battell of *Granson*, against the Switzers. Some triall also would be made, whether Pact or Agreement doe any thing; As if two Friends should agree, that such a Day in everie Weeke, they being in faire Distant Places, should Pray one for Another; Or should put on a Ring, or Tablet, one for anothers Sake; Whether if one of them should breake their Vow and Promise, the other should have any Feeling of it, in Absence.

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If there be any Force in Imaginations and Affections of Singular Persons; It is Probable the Force is much more in the Iynct imaginions and Affections of Multitudes: As if a Victorie should be won or lost, in Remote Parts, whether is there not some Sense thereof, in the People whom it concerneth; Because of the great Ioy, or Griefe, that many Men are posselt with, at once? *Pim Quintus*, at the verie time, when that Memorable Victorie was won, by the Christians, against the Turks, at the Navall Battell of *Lepanto*, being then hearing of Causes in Consistorie, brake off suddenly, and said to those about him, It is now more time, wee should give thanks to God, for the great Victorie hee hath granted us, against the Turks, It is true, that Victorie had a Sympathy with his Spirit; For it was meerely his Worke, to conclude that League. It may be, that Revelation was Divine; But what shall we say then, to a Number of Examples, amongst the Grecians, and Romans? Where the People, being in Theaters at Playes, have had Newes of Victories, and Overthrowes, some few dayes, before any Messenger could come.

It is true, that that may hold in these Things, which is the generall Root of Superstition: Namely, that Men observe when Things Hit, and not when they Misse: And commit to Memorie the one, And forget and passe over the other. But touching Divination, and the Misgiving of Mindes, wee shall

shall speake more, when wee handle in generall, the *Nature* of *Mindes*, and *Soules*, and *Spirits*.

Wee have given formerly some *Rules* of *Imagination*; And touching the *Fortifying* of the Same. Wee have set downe also some few *Instances*, and *Directions*, of the *Force* of *Imagination*, upon *Beasts*, *Birds*, &c. upon *Plants*; And upon *Inanimate Bodies*: Wherein you must still observe, that your *Trialls* be upon *Subtill* and *Light Motions*, and not the contrary; For you will sooner, by *Imagination*, binde a *Bird* from *Singing*, than from *Eating*, or *Flying*: And I leave it to every *Man*, to choose *Experiments*, which himselfe thinketh most *Commodious*; Giving now but a few *Examples* of every of the Three *Kindes*.

Use some *Imaginant*, (observing the *Rules* formerly prescribed,) for *Binding* of a *Bird* from *Singing*; And the like of a *Dogge* from *Barking*. Trie also the *Imagination* of some, whom you shall accommodate with things to fortifie it, in *Cocke-Fights*, to make one *Cocke* more *Hardy*, and the other more *Cowardly*. It would be tried also, in *Flying* of *Hawkes*; Or in *Courting* of a *Deere*, or *Hare*, with *Grey-hounds*; Or in *Horse-Races*; And the like *Comparative Motions*: For you may sooner by *Imagination*, quicken or slacke a *Motion*, than raise or cease it; As it is easier to make a *Dogge* goe slower, than to make him stand still that he may not run.

In *Plants* also, you may trie the *Force* of *Imagination*, upon the *Lighter* Sort of *Motions*: As upon the *Sudden Fading*, or *Lively Comming up* of *Herbs*; Or upon their *Bending* one way, or other; Or upon their *Closing*, and *Opening*; &c.

For *Inanimate Things*, you may trie the *Force* of *Imagination*, upon *Staying* the *Working* of *Beere*, when the *Barme* is put in; Or upon the *Comming* of *Butter*, or *Cheese*, after the *Cherming*, or the *Rennet* bee put in.

It is an *Ancient Tradition*, every where alleaged, for *Example* of *Secret Proprieties* and *Influxes*, that the *Torpedo Marina*, if it be touched with a long *Sticke*, doth stupefie the *Hand* of him that toucheth it. It is one degree of *Working at Distance*, to worke by the Continuance of a *Fit Medium*; As *Sound* will be conveyed to the *Eare*, by striking upon a *Bow-String*, if the *Horne* of the *Bow* be held to the *Eare*.

The *Writers* of *Naturall Magicke*, doe attribute much to the *Vertues*, that come from the *Parts* of *Living Creatures*; So as they be taken from them, the *Creatures* remaining still alive: As if the *Creature* still living did infuse some *Immateriate Vertue*, and *Vigour*, into the *Part Severed*. So much may be true; that any *Part*, taken from a *Living Creature*, newly *Slaine*, may be of greater force, than if it were taken from the like *Creature*, dying of it selfe, because it is fuller of *Spirit*.

Triall would be made, of the like *Parts* of *Individualls*, in *Plants*, and *Living Creatures*; As to cut off a *Stocke* of a *Tree*; And to lay that, which you cut off, to *Putrifie*, to see whether it will *Decay* the *Rest* of the *Stocke*: Or if you should cut off part of the *Taile*, or *Legge* of a *Dogge*,

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or a *Cat*, and lay it to *Putrifie*, and so see whether it will *Fester*, or keepe from *Healing*, the *Part* which remaineth.

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It is received, that it helpeth to *Continue Love*, if one weare a *Ring*, or a *Bracelet*, of the *Haire* of the *Party Beloved*. But that may be by the *Exciting* of the *Imagination*: And perhaps a *Glove*, or other like *Favour*, may as well doe it.

997

The *Sympathie* of *Individuals*, that have beene *Entire*, or have *Touched*, is of all others the most *Incredible*: Yet according unto our faithfull *Manner of Examination* of *Nature*, we will make some little mention of it. The *Taking away* of *Warts*, by *Rubbing* them with Somewhat that afterwards is put to waste, and consume, is a *Common Experiment*: And I doe apprehend it the rather, because of mine owne *Experience*. I had, from my *Childhood*, a *Wart* upon one of my *Fingers*: Afterwards when I was about *Sixteene Yeares* old, being then at *Paris*, there grew upon both my *Hands* a *Number* of *Warts*, (at the least an hundred,) in a *Moneths* space. The *English Embassadors Lady*, who was a *Woman* farre from *Superstition*, told me, one day; Shee would helpe me away with my *Warts*: Whereupon shee got a *Peece* of *Lard*, with the *Skin* on, and rubbed the *Warts* all over, with the *Fat Side*; And amongst the rest that *Wart*, which I had had from my *Childhood*; Then she nailed the *Peece* of *Lard*, with the *Fat* towards the *Sunne*, upon a *Post* of her *Chamber Window*, which was to the *South*. The *Succeffe* was, that within five weekes space, all the *Warts* went quite away: And that *Wart*, which I had so long endured, for *Company*. But at the rest I did little marvell, because they came in a *Short time*, and might goe away in a *Short Time* againe: But the *Going away* of that, which had staid so long, doth yet sticke with mee. They say the like is done, by the *Rubbing* of *Warts* with a *Greene Elder Sticke*, and then *Burying* the *Sticke* to *Rot* in *Mucke*. It would be tried, with *Cornes*, and *wenns*, and such other *Excreescences*. I would have it also tried, with some *Parts* of *Living Creatures*, that are nearest the *Nature* of *Excreescences*; As the *Combes* of *Cocks*, the *Spurres* of *Cocks*, the *Hornes* of *Beasts*, &c. And I would have it tried both wayes; Both by *Rubbing* those *Parts* with *Lard*, or *Elder*, as before; And by *Cutting off* some *Peece* of those *Parts*, and laying it to *Consume*; To see whether it will *Worke* any *Effect*, towards the *Consumption* of that *Part*, which was once *Ioyned* with it.

998

It is constantly Received, and Avouched, that the *Anointing* of the *Weapon*, that maketh the *Wound*, will heale the *Wound* it selfe. In this *Experiment*, upon the Relation of *Men* of *Credit*, (though my selfe, as yet, am not fully inclined to beleve it,) you shall note the *Points* following. First, the *Ointment*, wherewith this is done, is made of *Divers Ingredients*; whereof the *Strangest* and *Hardest* to come by, are the *Mosse* upon the *Skull* of a *dead Man*, *Vnburied*; And the *Fats* of a *Boare*, and a *Beare*, killed in the *Act* of *Generation*. These two last I could easily suspect to be prescribed as a *Starting Hole*; That if the *Experiment* proved not, it mought be pretended, that the *Beasts* were not killed in the due *Time*; For

For as for the *Mosse*, it is certaine, there is great Quantitie of it in *Ireland*, upon *Slaine Bodies*, laid on *Heaps*, *Vnburied*. The other *Ingredients* are, the *Bloud-Stone* in *Powder*, and some other *Things*, which seeme to have a *Vertue* to *Stanch Bloud*; As also the *Mosse* hath. And the *Description* of the whole *Ointment* is to be found in the *Chymicall Dispensatorie* of *Crollius*. Secondly, the same *Kind* of *Ointment*, applied to the *Hurt* it selfe, worketh not the *Effect*; but onely applied to the *Weapon*. Thirdly, (which I like well) they doe not observe the *Consecrating* of the *Ointment*, under any certaine *Constellation*; which commonly is the *Excuse* of *Magicall Medicines*, when they faile, that they were not made under a fit *Figure* of *Heaven*. Fourthly, it may be applied to the *Weapon*, though the *Partie Hurt* be at great *Distance*. Fifthly, it seemeth the *Imagination* of the *Partie*, to be *Cured*, is not needfull to *Concurre*; For it may be done, without the *Knowledge*, of the *Partie Wounded*; And thus much hath beene tried, that the *Ointment* (for *Experiments* sake,) hath beene wiped off the *Weapon*, without the *Knowledge* of the *Partie Hurt*, and presently the *Partie Hurt*, hath beene in great *Rage* of *Paine*, till the *weapon* was *Reannointed*. Sixtly, it is affirmed, that if you cannot get the *Weapon*, yet if you put an *Instrument* of *Iron*, or *Wood*, resembling the *Weapon*, into the *Wound*, whereby it bleedeth, the *Annointing* of that *Instrument* will serve, and worke the *Effect*. This I doubt should be a *Device*, to keepe this strange *Forme* of *Cure*, in *Request*, and *Use*; Because many times you cannot come by the *Weapon* it selfe. Seventhly, the *Wound* must be at first *Washed cleane*, with *White Wine*, or the *Parties owne Water*; And then bound up close in *Fine Linnen*, and no more *Dressing* renewed, till it be whole. Eighthly, the *Sword* it selfe must be *Wrapped up Close*, as farre as the *Ointment* goeth, that it taketh no *wind*. Ninthly, the *Ointment*, if you wipe it off from the *Sword*, and keepe it, will *Serve againe*; and rather *Increase* in *Vertue*, than *Diminish*. Tenthly, it will *Cure* in farre *shorter Time*, than *Ointments* of *Wounds* commonly doe. Lastly, it will *Cure a Beast*, as well as a *Man*; which I like best of all the rest, because it subjecteth the *Matter*, to an *Easy Trial*.

I Would have Men know, that though I reprehend, the *Easie Passing* over, of the *Causes* of *Things*, by Ascribing them to *Secret* and *Hidden Vertues*, and *Proprieties*; (For this hath arrested, and laid asleepe, all true *Enquiry*, and *Indications*;) yet I doe not understand, but that in the *Practical* Part of *Knowledge*, much will be left to *Experience*, and *Probation*, whereunto *Indication* cannot so fully reach: And this not onely in *Specie*, but in *Individuo*. So in *Physicke*, if you will cure the *laundies*, it is not enough to say, that the *Medicine* must not be *Cooling*; For that will hinder the *Opening* which the *Disease* requireth: That it must not be *Hot*; For that will exasperate *Choler*: That it must goe to the *Gall*; For there is the *Obstruction* which causeth the *Disease*, &c. But you must receive from *Experience*, that *Powder* of *Chamapysis*, or the like, drunke in *Beere*, is good for the *laundies*: So againe, a wise *Physitian* doth not continue

Experiment
Solitary, touch-
ing the Gen-
eral Sympathy
of Mens Spirits.
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All the same Medicine, to a Patient; But he will vary, if the first Medicine does not apparently succeed: For of those Remedies, that are good for the *Immoderate Stone, Agues, &c.* that will doe good in one Body, which will not doe good in another; According to the Correspondence the Medicine hath to the *Individual Body*.

THe Delight which Men have in *Popularitie, Fame, Honour, Submission, and Subjection* of other Mens *Mindes, Wills, or Affections*, (although these Things may be desired for other Ends,) seemeth to be a Thing, in it selfe, without Contemplation of Consequence, Gratefull and agreeable to the Nature of Man. This Thing (surely) is not without some Signification, as if all *Spirits and Soules* of Men, came forth out of one *Divine Limbus*; Else why should Men be so much affected with that, which others thinke, or say? The best Temper of *Mindes* desireth *Good Name, and True Honour*: The Lighter, *Popularitie, and Applause*; The more depraved, *Subjection, and Tyranny*; As is scene in great *Conquerours, and Troublers* of the World:

And yet more in *Arch-Hereticke*; for the Introducing of new *Doctrines*, is likewise an *Affestation* of *Tyranny, over the Understan- dings, and Beliefes* of Men.

I would have Men know, that though I repeated, the *Table* by Aristotle, them to *Speere* and *Widdow*; For this hath attel'd, and laid all aspe, all true *Experiments*; yet I doe not understand, but that in the *Part* of *Knowledge*, much will be left to *Experience, and Observation*, who unto *Education* can not fully reach: And this not only in *Speere*, but in *Education*. So in *Speere*, if you will cure the *Wanderer*, it is not enough to say, that the *Medicine* will not be *Cooling*; For that will binde the *Operation* which the *Disease* requirith: That it will not be *Hot*; For that will *Exasperate* the *Disease*: That it will goe to the *Gall*; For there is the *Obstacle* which caneth the *Disease*, &c. But you must receive from *Experience*, that *Power* of *Compaigny*, or the like, drinke in *Wine* is good for the *Liver*: So againe, a *Wife* *Physian* doth not continue

TABLE

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Experiment
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F I N I S.

His Lo^{ps}. Usuall Receipt for the Gout, to
which the Sixtieth Experiment hath reference, was this.

To be taken in this Order.

1. The Pultasse.

R^c Of *Manchett*, about 3. Ounces, the *Crumme* onely, thin cut;
Let it be boyled in *Milk*, till it grow to a *Pulp*. Adde, in the
end, a *Dramme*, and an halfe, of the powder of *Red Roses*.
Of *Saffron* 10. Graines.
Of *Oyle of Roses* an Ounce.
Let it be spread upon a *Linnen Cloth*, and applyed luke-
warne; And continued for three *Houres* space.

2. The Bath, or Fomentation.

R^c Of *Sage-Leaves*, half an handfull.
Of the *Root of Hemlock*, Sliced, 6. *Dramms*.
Of *Briony Roots*, half an Ounce.
Of the *Leaves of Red Roses*, 2. *Pugills*.
Let them be boyled, in a pottle of *Water*, wherein *Steele*
hath been quenched, till the *Liquour* come to a *Quart*.
After the *Straining*, put in halfe an handfull of *Bay-*
Salt.
Let it be used, with *Scarlet Cloth* or *Scarlet Wooll*, dip-
ped in the *Liquour*. hot, and so renewed seven times; All
in the space of a *Quarter of an Houre*, or little more.

3. The Plaster.

R^c *Emplastrum Diacalciteos*, as much as is sufficient, for the
part, you meane to cover. Let it be dissolved with *Oyle of Ro-*
ses, in such a *Consistence*, as will stick; And spread upon a peece
of *Holland*, and applyed.